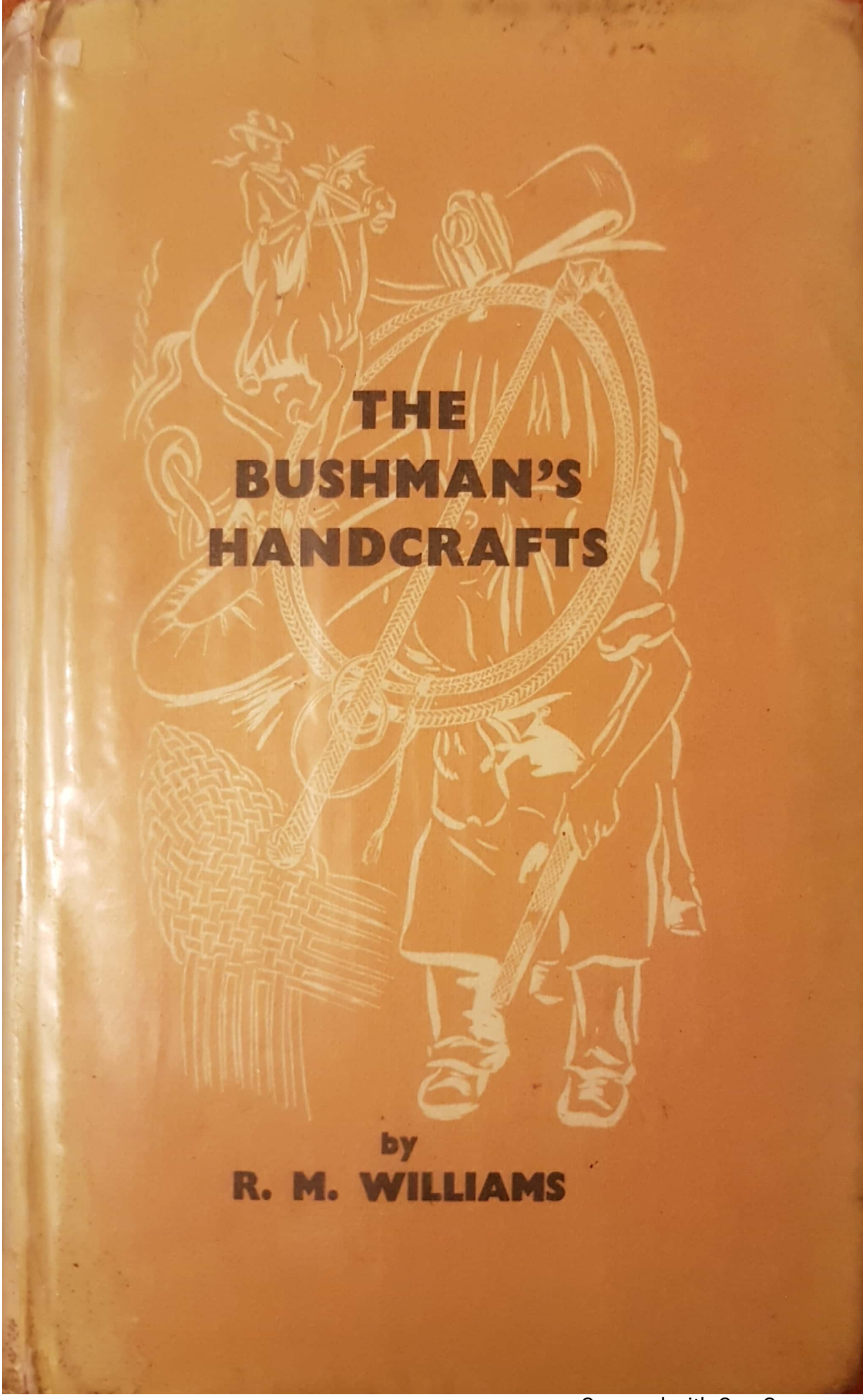

THE BUSHMAN'S HANDCRAFTS

by

R. M. WILLIAMS

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R. M. WILLIAMS

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FOREWORD

The Bushman's Handcrafts is the revision of a previous edition issued over 20 years ago. It is the result of many years of experience and experiment during that time and is designed to assist young bushmen who are handy and who want to MAKE THINGS. The tanning section is the result of a lifetime spent among tanners and leather goods, during which experienced tanners of all types of leathers have been consulted and have co-operated to produce leathers used by the author during that time. Since the first volume was printed the theories and practice of tanning have been tested in commerce to the extent of Australian and world-wide sale of leather goods, and the leathers so made up into boots and saddles have become famous for durable service.

As regards the other chapters such as shoeing, plaiting, saddling etc., many experts have been consulted and at the time of the issue of this book, the crafts set out are being actively practised by myself and family who live in the bush with me working cattle and horses. Our findings concerning the usefulness or otherwise of all types of goods and material are translated into manufacture of bushmen's tools of trade such as stockwhips, boots, saddles, horseshoes, spurs, bridles, packs - in fact everything we can make with confidence concerning their usefulness and quality.

No secrets concerning manufacture have been withheld and any questions concerning the making of goods will be answered to the full extent of our ability to do so. In a small book like this one cannot give answers to every possible detail of making, but the outlines are there and will serve as guide posts to beginners. Have a go at making a pair of boots, a saddle or a whip, and you will see what a lot of trial and error has gone into the making of the vast range of goods which we market today; and the whole range has been mastered by careful experiment at home. You can do the same if you want to. Have a try... we will help you.

R. M. Williams.

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Tanning and Fur Dressing

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INTRODUCTION TO TANNING

YOU can tan leather - in the bush - with the simplest of materials, and in the next detailed pages you will see how simple it is. To make good leather will take care and some work, but you can do it.

All skins will make leather of some sort but each type of skin makes its own special type of leather best. Kangaroo hide is the best whip leather in the world; it also will make boot uppers. Calf skins are suited to fine leathers such as ladies' handbags, fine boots or shoes, but are not tough enough for whips. Cow hide makes sole leather, saddle flaps, bag leathers when split - in fact cow hide will make most sorts of leather except such fine leathers as kid. Kid, or young goat makes very fine leather indeed, being used for best wear shoes and highest grade boots.

Skins such as possum are only useful for fur rugs. Deer skins make soft garment leather. All can be tanned with the hair or fur on, and as such can be used as mats or rugs; therefore before you start to tan any skin, determine what the skin is best suited for and tan accordingly.

Although this book is written for amateurs it is the work of many experts tanning commercially; the recipes set out are the valuable concentration of many lifetimes of tanning or the accumulated knowledge of the tanning trade. Without expensive machinery you can make useful leather, and with the addition of a splitting machine and press you can make almost any leather.

Heavy cow hides need splitting to make some leathers but the job can be done by hand if you are prepared to work on it. A press for finishing leather to give it a commercial look can be made at home. I will not deal with split leathers nor fine finishes, so that for the purpose of making bush leathers you will need no machinery. I have mentioned a drum in the soaking of hides. This can be done without by hand agitation twice a day - not so good of course, as a drum rotated by a motor, but effective.

A lot of water is needed for tanning so that you will need to work near a good supply of water and be able to dispose of the excess water. Build an open shed with brick or stone pits above ground. Pits can be 7 ft by 4 ft for large hides and 5 ft by 3 ft for Kangaroo and such, while small furs can be done in a glass jar or plastic tube large enough to take several skins or say 5 galls of water. Cement pits will take some using to temper properly - you will not get the best leather out of a new pit.

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TANNING BY THE CHROME METHOD

Most of the leather used today in boot uppers, car upholstery, belting, fancy goods, etc., is tanned by the chrome process. Even boot sole leather is often tanned by chrome now but it is doubtful whether it will ever replace bark in general saddlery leather, although there are numbers of all-green chrome saddles on the market which are standing up well to general use.

SOAKING

All hides must be soaked as a preliminary to the manufacture of all classes of leather; it is the foundation of good leather and if the soaking is not well done the leather will not be good. Unless the skin is soaked back to the same soft condition in which it came off the beast, all other processes will suffer accordingly.

Even fresh skins need to be soaked to remove the blood, salt, dung and other refuse. Blood will leave stains on the finished leather and also increase bacterial activity in the limes. Soaking must be done in running or often-changed water and, being such an important part of the tanning process, is best done in a latticed drum revolving at the pace of about six revolutions a minute; afterwards cleansing in fresh water and left about an hour. Drumming helps to remove the extraneous matter. Salted dry hides take a lot of water and the circulation of ample water should not be restricted. Heating of the water to at least 75 degrees fahrenheit will assist if the weather is cold; greater heats are not to be recommended. With hard, bone dry hides salted, soak for twenty-four hours and, changing to clean water, add one gallon of formic acid per thousand gallons of soaking water. Lactic or acetic acids will do. Sulphuric in the same proportions will help if the other acids are not available. Same percentage using commercial grade.

With stiff hides, the action of the soaking can be continued with the lightly acidified water until they can be bent without springing back and then drumming in fresh water will hasten the softening process. No drumming until softness has made cracking unlikely. Successive treatment must be kept up with slightly acidified water until the hides are in a fresh condition, viz., as soft as if straight off the beast. Potash can be used as an alternative to acid; with a weak solution good swelling

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and softening effect can be obtained. Do not use potash for fur or wool. One part in a thousand is strong enough for alkalis, also caustic soda in this strength is quite good.

If the hides are so hard and intractable that they cannot be handled after considerable soaking as recommended, then slightly stronger acid or caustic bath can be used, but take care to wash out all chemicals before starting the liming.

LIMING

Liming is the method used for removing the hair. Use only well-slaked lime; damage can occur if insufficiently slaked lime is used. When slaking it is a good rule to add about the same weight of water as lime and leave for three days. A brick pit is good for liming. Use plenty of lime and stir or pull skins right out every day and replace until the hair is loose. A lime pit will be good for several batches of skins. Remember to stir well before putting skins into the liquor.

DEHAIRING

When well limed, the hair can be rubbed off by placing over a beam and the hair rubbed off with a blunt two-handled knife sold for the purpose. Turn the hide over and using a slightly convex sharp knife, slice the flesh off. This is a skilled job so practise slowly until you can slice the hide cleanly. Good fleshing also determines the quality of the leather.

WASHING AND DELIMING

After liming, the lime must be washed out thoroughly. Add a small amount of milk of lime to the wash, then set the wash in motion and keep running water over the skins for a half hour. Then slightly heat the water (about 90 degrees F.) and wash for another half hour in running water. Some use a slightly acid wash after this but as bating takes place better in alkaline than acid it is better to leave slightly alkaline. When leather with a great deal of stretch is required the wash must be well done. If acid is to be used then boric is the best. Use it sparingly - less than one in a thousand by weight.

These processes are best carried out in a drum that slowly revolves and anyone who intends to do much tanning would do well to make a drum by placing a bearing on each end of a barrel and turning slowly with a belt on a small pulley. One

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horsepower with a very small pulley running about the barrel will give you the degree of reduction from the average small engine. Opening in the wooden barrel is cut with a fret saw and the cover sealed with a light board and rubber gasket.

You can simply test the surfaces of the delimed hide by mixing one part of Phenol-Phthalein to 100 parts of methylated spirit and one drop of this mixture will bring a red discolouration to the cut skin if excess lime is present.

For the use of amateurs, the process of bating or plumping the fibres with an enzyme is too involved but briefly the meaning of puering or bating is to plump out the fibres with a ferment of fowls manure or with a commercial enzyme.

If liming and previous work has been carefully done then this is unnecessary.

The process so far set out applies to all kinds of hides and skins but from here we will consider more particularly the chrome method as applied particularly to kangaroo hides either for fur or leather.

If the skins are required for fur, then the last part on dehairing does not apply.

PICKLE

Pickling is a preliminary to tanning; it serves two purposes. Firstly it preserves the skin from fermentation and spoilage by bacteria and secondly it neutralises the skin after the liming.

Neutralisation is sometimes achieved with a bran wash but that is slow and, although quite practical, not necessary if the skin is to be pickled. Pickling also helps in the penetration of the chrome salts.

The pickle consists of $1\frac{1}{2}$ lb. of salt to a gallon of water, or 150 lb. to one hundred gallons, plus an ounce of commercial sulphuric acid to the gallon of water.

Now to be more positive for the small tanner just beginning with say two kangaroo skins, using to pickle the two, say three gallons of water which is about right. Dissolve $4\frac{1}{2}$ lb. of salt by boiling the water, allow the salt solution to get cool and then pour three ounces of sulphuric acid into the solution being careful to apply acid slowly and down the side of the vessel.

Take care adding acid to water. Soak in the pickle for a day or drum for an hour. A rotating drum is a great help in this form of tanning.

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TANNING

Now to prepare the tanning bath. Dissolve 15 lb. of chrome alum in 5 gallons of water at blood heat or a little less. When the whole of the chrome alum has gone into the solution, add carefully 4 lb. of washing soda that has been dissolved in $2\frac{1}{2}$ gallons of water (hot). This solution must be added cautiously. Stir thoroughly, after which this mixture will keep indefinitely.

The tanning is now easy, being carried out by simple immersion with occasional stirring. Here again a drum is a great help as it makes even concentration of the material in the skin. When the skins are first immersed in the solution previously prepared, it is advisable to add a little of the tanning solution to the skins immersed in clean water and proceed by the hour in strengthening the solution until it is all added. I have indicated the amount necessary to complete the tanning of the two kangaroo skins originally pickled, viz., 5 gallons, plus $2\frac{1}{2}$. This solution could be used again to start the next batch as it is slightly more than is required for two skins; although not if the skins happen to be extra large ones of say 4 lb. weight dry, each. Eight hours should tan the ordinary hide. A good test of complete tanning is to cut a small piece of the skin and immerse it in boiling water. If well chrome tanned it will not shrink up.

Place the skins in a bath of warm water and wash thoroughly to remove the chrome salts.

Now the skins have to be neutralised to stop the acid effect of the remaining chrome salts. It is advisable to use ordinary borax for this purpose in the percentage of two percent by weight, e.g. 4 lb. of skins will take less than an ounce of borax. Best to test for neutral condition with litmus, but this is not absolutely necessary for your purpose; about an hour in the neutral bath will suffice.

If a piece of blue litmus paper is firmly pressed to the grain of the skin and it turns red then you know that the skins are still acid; add a little more borax to the wash. Wash again in clean warm water to wash out the chemicals.

FATLIQUORING

This is an essential part of most tanning and consists of lubricating the skin with a finely divided emulsion of oil or fatty matter in a suitable medium. There are many methods

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of making such a fatliquoring material but for your purpose, i.e., tanning of small skins, I suggest that you purchase some sulphonated neatsfoot oil. Mix it thoroughly with water and paint on the skin after it has been tacked out. Mix the sulphonated oil with half water and shake well. One coat before drying should suffice.

DRYING

Care must be taken at all times in drying out furred skins that the flesh is not exposed to the sun; also that the fur is dry as well as the skin before taking the skin off the drying board. When the skin is dry it must be worked up or staked; pulled over a beam. In other words, softened by any and all means possible. Pulling between the hands with a quick sharp motion separates and brings the hair upright. Rubbing between the fingers softens the skin.

This is a brief and concentrated description of the chrome method but all methods and materials have been considered in bringing to you this short chrome tanning article; with due regard to the difficulties experienced by an amateur in getting materials and general lack of equipment.

Should there be anyone who wants to set up a drum and go in for tanning leather properly for boot uppers or leather for saddle flaps, I suggest that you write to me care of "Hoofs and Horns" and I will discuss the problem with you by mail or talk it over with you in detail.

MATERIALS

The methods set out require: Sulphuric acid - obtainable from a chemist; Borax - from a grocer; Salt - grocer; Chrome alum salts - from a tannery or wholesale druggist; Washing Soda - from a grocer; Litmus paper - available from your local chemist.

The vessel for pickling is the biggest problem. I suggest a stainless steel vessel or a wooden tub. It should be large enough to hold 5 gallons of water, working on the basis that you will do two skins at a time.

An interesting comparison is that of the three methods set out for tanning skins, I have found that the simplest one is far the best, viz., salt and sulphuric with the sulphonated oil dressing.

You will note that this method is a basic part of the chrome tanning process also.

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TANBARKS FROM NATIVE TREES

It is all very well to say to the beginner in a short article on tanning, "treat the skins in a progressively stronger tanning solution." Behind this there is a wealth of information, not available in books, concerning the barks of Australia that will tan and also concerning the colour of leather that they will produce - particularly if one is out to tan calf suitable for tooling or other fine leather that has a nice golden colour, or has a light colour produced without bleaching the leather after tanning. The result of bleaching the colour out of leather is quite good so long as the leather is not exposed to sunlight, but as soon as it gets the sun it goes pink and gradually goes darker until there is no great gain in having bleached it at all. I might add that most, if not all, commercial tooling calf has been bleached and has that nasty habit of going pink in the sun instead of keeping a good mellow pale tan or golden colour.

Well, now the cure is in the tanning barks used and particularly in the preparation of the bark as it comes off the tree.

You might try all your local gums and wattles to see what colour tanning material soaks out of them, by first drying in an oven without exposure to the sun and then leaching the tanning out of them either ground up or in warm water. Most barks will leach better if ground or pulverised.

Suppose you find a local gum that has a nice light tanning material but is not very strong in tannic acid, then it might be well to compromise with a little wattle bark which, if a little dark, still tans paler with a mixture of other barks.

All barks darken in the sun, so make a point of keeping all the bark in the shade or, better still, wrap it up until you can pulverise and leach it for use. Do not boil out the tanning material but pour hot water over it and let it leach out that way. Make sure that it does not come into contact with any metal whatsoever, as iron, in particular, will completely ruin any tan. The first fortnight of immersion in the tanning material will usually fix the colour of the leather and it is well to start the tanning in very weak bark, preferably in a bark that has a light colouring matter. Some trees like bloodwood have a very dark tanning matter in them, whilst some gums are paler than is required. Green bark will tan just as well as dried bark, and if you have the opportunity to use it green there is no reason why you should not do so. It is not a bad policy when preparing tan bark to remember that the tan must be light to start, but once the colour is through the leather

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the final fortnight can be as strong as possible, and this firms up the leather - an extra week in the strong tan will not hurt. Remember that a new cement pit will almost invariably discolour leather, and it is best to use a bath. Better still, use an old beer cask; it does not discolour.

Now I have set you a task to find out all about the tanning colours of your local timbers, and will be glad to discuss the problems with you as the experiments proceed.

Tanning and Fur Dressing

PREPARATORY WORK

Half of your success in tanning depends on the handling of hides before they reach the tan liquor. Following are the preliminary operations that may be necessary, arranged in the order they are performed. Not all of these operations are necessary for every skin; use only those which conditions demand.

CURING

The small pelts of all common furbearers and the hides of rabbit, calf, sheep and goat, need no special treatment in cold weather to preserve them until ready to tan. Open skins of the small animals can be tacked to a door or side of a building. Trim off ragged edges or points and cut and scrape off the shreds of muscle or fat which adhered to the hide when skinning. When perfectly dry, hides are removed from stretchers or from side of building and stored in a dry, cool place until ready to tan.

In warm weather different handling is required. Salt is necessary to preserve the skins of all small animals, and heavy hides as large as buffalo, horse or cow, should always be salted, no matter whether skinned in summer or winter, if you intend to tan them. In case a farm animal must be skinned in warm weather and you do not wish to tan it yourself, sell it immediately, unsalted, to a local buyer, if possible. If it must be shipped away you must use salt to prevent spoiling, as directed in the following section. Use plenty - it can do no harm.

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SALTING

After the hide has been trimmed and roughly fleshed, spread it out flat on the ground or barn floor and cover the flesh side with dry coarse salt. After three days, shake off any salt which has not been absorbed by the skin and hang the hide over poles or ropes so air strikes all sides freely. Do not hang hides in the sun or near a fire. When dry, store in a dry, cool place until you are ready to begin tanning. Never let a warm, green hide lie folded or rolled up without salt. Its own heat may badly damage it.

Salt is especially desirable when large hides are to be tanned with the hair on as it sets the hair and prevents shedding afterwards. A hide skinned in warm weather can be salted and dried, in which condition it will keep for a year. Even if a large hide is to be tanned soon, salt should be applied for a day or two before the final fleshing, since salt hardens the tissues so the fleshing knife removes them easily. Experienced tanners agree that for some reason a heavy hide which is properly salted and cured and allowed to lie a month or two, tans more easily and quickly than one put in the pickle immediately after being skinned.

SOAKING

Dry cured hides should be soaked soft before they are tanned or before they are given the final fleshing before tanning. They can be soaked soft in any of the tanning solutions given in this book, but this is not advised. Soaking takes additional time and there is danger of not leaving the skin in the solution long enough to complete both soaking and tanning. Soaking a dry hide may also weaken the pickle since there is usually tissue and fat to absorb it.

In cold weather hides may be soaked in clear water until they are soft. Even then watch the hide and do not leave it in the soaking solution too long. In warm weather use a solution of soft water, borax and soap chips. Use borax as you would any water softener and put in enough soap to make a thin suds on top of water. Unless the hide was previously salted, add a handful of salt to prevent spoiling. For soaking high quality hides and furs use the following solution for the best results:

4 gallons water
½ ounce borax
2 ounces soap
½ pint salt
¾ ounce sulphuric acid

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Dissolve soap first in a little water before adding it to the solution. Omit salt if hide has been previously salted. Sulphuric acid will burn severely if it contacts your skin. Pour slowly and carefully to avoid splashing and spattering. Do not lean so close as to breathe its fumes when pouring. Make enough of the solution to cover hides, using the above proportions. Immerse until every part of the hide feels perfectly soft and supple to the fingers, the usual time required being from two to four hours. Then remove and rinse well in clear water to remove soap.

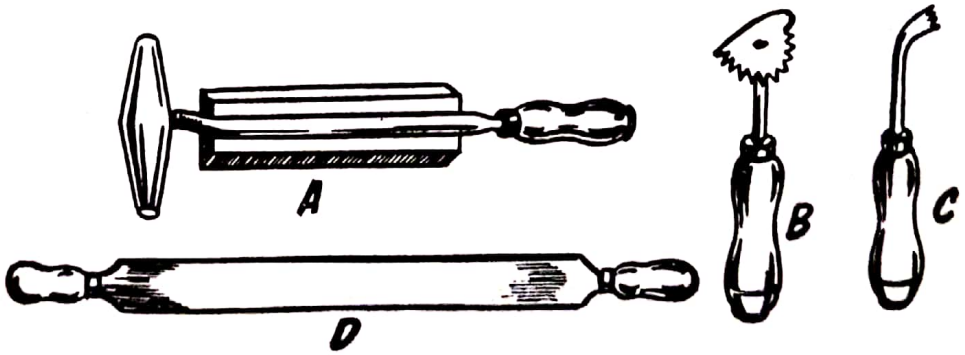
FLESHING

Small pelts can be fleshed on stretcher boards. Larger skins should be handled on what tanners call the fleshing beam (Fig. 2). This is a heavy timber or small log, rounded on top with one end supported waist-high by two legs. The other end rests on floor or ground. A five-foot length of a log ten inches in diameter will make a splendid fleshing beam for the amateur tanner. Legs are driven in auger holes in the log. The hide is spread over the high end; the operator presses against the end of the beam to hold the hide firmly between it and his body, then with a fleshing knife or tool he pushes away from his body and scrapes or shaves off the tissue.

Fig. 2
FLESHING BEAM

Various substitutes for the tanner's currier or skiving knife ("A" Fig. 3) are used by amateurs for fleshing, dehairing and graining skins.

TOOLS FOR FLESHING HIDES



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TOOLS FOR FLESHING HIDES

A - The professional tanner's currier, or skiving knife. Both sides of the blade are ground bevel like a wood chisel. The edge is then turned forward and over with a burnisher. This turned edge cuts like a plane, shaving off a thin slice at each stroke. Some skill is necessary to use this tool without cutting the hide.

B - Plumber's shave-hook with one edge filed into fine teeth.

C - Scraper made from ordinary screwdriver. Useful for very small skins.

D - Rasp, or file, fitted with two handles, and with both edges ground square like skate blades.

You can also use the following:

Hack-saw blade with fine teeth.

Carpenter's draw knife with adjustable handles

Draw knife with regular handles bent by blacksmith until they are parallel to the blade.

A common hog scraper as used in butchering.

Almost any steel tool that is easily grasped and which has a scraping - not a cutting - edge may be used.

When fleshing or graining, be sure the hair on fur side is free from burrs and snarls or you may cut through the skin. For the same reason smooth out all wrinkles so the hide lies flat over beam. Work the way the hair grows, not against it.

If a dry hide is especially tender, or if you doubt your skill to work off the debris with a scraper or knife, use a sandpaper block while the hide is still dry, before it is soaked. This will cut off flesh and the hard, glue-like membrane present on many cured hides. Sandpaper works slowly, but without any danger of damage. Simply glue a piece of sandpaper to a short length of 2 by 4 and fasten some kind of handle on top. For small skins, fasten a sandpaper block in a vice and draw the skin back and forth over it. Sandpaper is recommended for fleshing tender skins like those of rabbit and possum.

DEHAIRING

After they have been soaked and fleshed, hides which are

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to be tanned without hair or fur are put in the dehairing solution. Mix one quart of hardwood ashes to each gallon of water to loosen hair. Very heavy hides may require the following solution:

1 gallon soft water 1 quart ashes
$\frac{3}{4}$ quart slaked lime

Make enough to cover skins. Soak for three hours, remove, let drain ten minutes, then put back. Do this four times the first day, twice the second, and once daily thereafter. Test the hair often and do not soak an hour longer after it has loosened.

Lay hide on fleshing beam and with any of the fleshing tools previously described, push off hair and grain. The grain is a thin brown or dark cuticle skin just under the hair. It loosens with the hair and must be removed. If the hair is stubborn in spots, rub ashes in them. This offers resistance to the tool and helps slip off the grain. If hardwood ashes are not obtainable use a weak solution of lime.

BATING

Hides which have had their hair loosened by a solution containing lime must go through a bate to kill the lime remaining in the fibres, otherwise hide will suffer through shortened life and impaired strength. After you have pushed off hair and grain, put the hide into one of the following bates, which are arranged in the order of their desirability.

Solution No. 1
1 quart of chicken manure, free of litter
1 gallon water
2 cups bran

Soak hide in this solution for from 36 to 48 hours, depending upon its thickness and size. Rinse well in clear water.

Solution No. 2
1 pint sharp cider vinegar 3 parts soft water

Soak from 5 to 8 hours depending upon weight of skin. Rinse in clear water.

Solution No. 3
1 gallon boiling water 1 quart bran

Keep solution at 70 degrees temperature to ferment. Leave skins in for from 24 to 36 hours.

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In directions for all of these bating solutions, the smaller length of time will suffice for skins the size of wallaby, possum and rabbit. The greatest time specified for immersion or soaking is recommended for large skins like those of cow and horse. For pelts the size of calf, sheep and goat, use an intermediate number of hours. Two or three hours overlong in any of these bates will not harm the hide.

A bate is not necessary when only ashes and water are used to loosen hair or fur.

DEGREASING

Very fat hides should be degreased. If fat is allowed to remain in the skin it repels tanning liquor and the skin does not tan evenly, if at all. Fat also rots finished leather. Only very fat skins like possum, and possibly skins from overfat animals will require this special treatment. Close, careful fleshing will press out much oil from a soaked hide, but if you suspect that oil remains in a troublesome quantity the hide should be degreased. No harm comes from degreasing if the hide did not require the treatment. Tanneries tumble fat skins in heated drums with detergent, but a petrol bath is the only method accessible to amateurs. Use common petrol, not ethyl mixtures, and soak the fat skin for one hour. Wring as dry as possible and hang up in the air until the petrol odor is gone.

This gasoline bath removes odor, cleans sheep pelts tanned with the wool on, and eliminates the objectionable odor of goat pelts. All hides are degreased just before they go into the tanning liquor.

THE TREATMENT OF FURS AND SKINS

Fortunately, one of the best tan processes for the amateur and home tanner is simple, inexpensive and fool-proof. Formula 1 can be used with splendid success on almost every variety and size of skin: rabbit, kangaroo, cat, opossum, wildcat (all varieties), house cat, dog, deer, sheep, goat, calf, horse and cow. These hides may be tanned either with or without hair, fur or wool.

There is nothing better than Formula 1 for preparing furs for making muffs, scarves, coats, rugs, robes and other types of fur garments. Formula 1 also tans dehaired hides into a good grade of leather, which, while not as strong and durable as regular wattle bark tan, is suitable for many uses on the station.

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Formula 1

1 gallon soft water 1 quart common salt
1 ounce sulphuric acid

Acid is common commercial strength, measure is fluid ounce. When using concentrated sulphuric acid, add only one-half ounce per gallon of water. Boil water and salt until latter is dissolved. Cool and slowly add acid. Do not breathe fumes and do not pour acid directly in water. Tilt receptacle in which solution is mixed and let acid run down the lower side so that it does not spatter and burn the operator. Never use hard water for tanning. Collect rain water if your well is hard. Tanning vessel must be glass, plastic or enamel.

The quantity of liquor or pickle given in the above formula will tan two ordinary fox hides, 1 good kangaroo. Use proportionate amounts for other sizes and numbers of hides. Be sure to mix up enough for the larger skins so the strength is not exhausted before tanning is completed. Do not use liquor twice. Prepare enough for the skins on hand and discard it after using.

Mix and use Formula 1 in plastic, wooden, glass or stoneware containers, never in galvanised tubs or pails. For the large hides, make tubs by sawing a wooden barrel in two.

The actual time required to tan depends upon weight and thickness of the skins and temperature of room where they set. For this reason exact periods cannot be stated. A small skin such as wallaby or rabbit will tan in two days. Hides of dogs, calves and sheep will require ten days. It will do no harm to let the skins lie in this solution longer than these stated average periods, since taxidermists use it to preserve skins and furs for months. If you are not sure, let the skins stay in this solution a day or perhaps two days, longer than the stated time. A little experience will quickly put you right.

If you should remove skins from the tanning solution before they are tanned, which will be evidenced by their refusal to "break" soft, or by spots of off-colour, simply put them back in the liquor again and let tan some more.

Skins should be submerged - covered by this liquor. Weight them down with stones if necessary. Turn and stir them several times each day. Keep in a temperature ranging between sixty-five and seventy degrees; if location is cold, more time is required.

This tan does not harm fur. Instead, it brings it out bright and clean.

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For tanning small, cheap skins quickly, the proportions of Formula 1 may be altered as follows:

2 quarts soft water — 1 pound salt
1 ounce sulphuric acid

If the hide is well soaked, a light one will tan over night. But unless some emergency exists that necessitates speed, follow the regular Formula 1. Strong solutions of acid may shorten the life of the leather.

After the hide is removed from Formula 1, or the above modification, wring it out dry. Small skins can be put through the clothes wringer with splendid results. Lay large hides on the fleshing beam and go over them with a fleshing knife, pressing out as much liquor as possible. Rinse well in clear water, then put them in an alkali bath to kill any acid remaining in pores of leather. Do not neglect this alkali bath whenever any mineral acid is used in tanning. The alkali bath is mixed as follows:

1 pail soft water
1½ cups common washing soda

Soak hides in this solution from one to four hours, depending upon thickness. Press out again on beam and rinse well in clear, soft water.

After rinsing out after alkali bath, the hide is ready for 'breaking'. The 'breaking' process, explained on pages 25, 26 and 27, should be begun before the hide is entirely dry.

Another modification of Formula 1 which will also work on any size or variety of hide is Formula 2, mixed as follows:

Formula 2

1 gallon soft water — 1 ounce alum
1 quart salt — 1 ounce sulphuric acid

Handle the hide exactly as for Formula 1, except for this one difference; when hide has been in the solution about six hours, take it out, drain, and pull and stretch to eliminate puckered, drawn appearance. Then replace and leave in time specified for Formula 1. Rinse, give soda bath, rinse and break. When hides have been properly broken, Formula 2 will produce good leather from very heavy hides. Oxalic acid may be used instead of sulphuric as in the following:

Formula 3

1 gallon soft water — 1 pint salt
2 ounces oxalic acid

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This formula is well adapted to light furs, which will tan in it in from eight to twenty-four hours. It has also been successfully used for dog and calf hides. The time required is from three to four days. Remove from liquor, press on beam, rinse in water, rinse in soda bath, rinse in water again, break and oil lightly with neatsfoot oil.

Any skin tanned with acid can be lightly oiled if it is not as soft and pliable as you wish. In oiling, do not apply enough to make the leather greasy. Apply sparingly and rub in well. Surplus oil can be removed by sprinkling hot corn meal or hot sawdust over the skin. When it has absorbed enough of the oil, brush off. Use sulphonated oil.

Formerly much home tanning was done with alum and salt. Used in this way alum has a serious fault. Being a powerful astringent, it puckers, hardens, shrinks and thickens a skin, all being directly opposite to the results we try to produce by tanning.

There is one time, however, when the exclusive use of alum is justified. This is with partly spoiled hides which have been heated until the hair is loose. Then if you want to save the hair or fur, use the following regular alum Formula 4. It will save the skin if anything can.

Formula 4

1 gallon soft water — 1 pound alum
½ pound salt

Heat water to dissolve alum and salt, cool to luke-warm and immerse skins. Make enough of this solution to cover them well. Time required is from two to six days, depending upon the weight of the hides. One-half ounce of saltpetre to the gallon of water, added to Formula 4, will help tan penetrate and hasten the time. We do not recommend this alum process for large hides or for furs unless they are partly spoiled. Alum skins are harsh, and difficult to stretch and break.

To tan small furs with slipping hair, mix the following:

Formula 5

¼ pound salt — 1 ounce borax
¼ pound alum — Enough water to dissolve

Then stir in corn meal until you have a thick paste. Spread this paste on the flesh side of the pelt, fold in centre and roll up. Put in a cool place for one week. Unroll each day and

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sprinkle coated side with water to keep paste damp. Then scrape off paste, clean and rinse in water, break hide until soft, oil lightly. Thick furs may require a second treatment of Formula 5. Avoid putting furs in good condition in an alum solution, as alum makes fur harsh and brittle. This statement does not refer to Formula 2, which has too little alum in it to produce such an effect.

TANNING LIGHT SKINS

Small skins of little value, like those of rabbits, are sometimes tanned by the following simple plan. Make a paste of:

½ cake laundry soap — 1 cup water
1 cup oatmeal

Dissolve or melt soap in water, then stir in oatmeal. Spread this over flesh side of skin and leave on from four to eight hours, depending upon the thickness of the hide. Scrape off, oil flesh side with old butter, bacon fat or neatsfoot oil and work and rub well to soften.

Many farm boys have started their tanning experience with this process. Since rabbit sheds easily, use the alum Formula 5 if you are willing to put more time and work in finishing rabbit skins.

BREAKING HIDES

Unfortunately, there is no magical formula or combination of chemicals that will turn raw, stiff hides into velvety fabric overnight. Considerable labour is necessary in the "breaking" process. If a skin or hide is not thoroughly softened by breaking, it will pucker, dry hard and wrinkled and be almost worthless for any practical use. Breaking means to work and manipulate the hide until its fibres are broken and softened. Breaking must start immediately after the skin is taken from the tanning liquor and rinsed. Begin work before the skin is entirely dry from its last rinsing. It will dry as you work, of course; and, if you

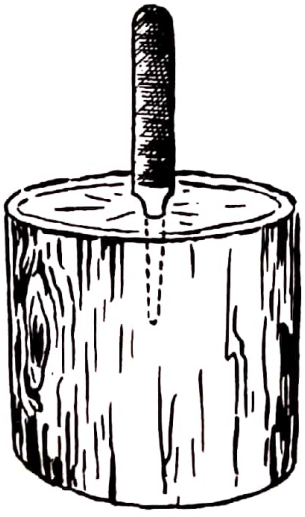

Fig. 5

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are not through by the time it is completely dry, moisten the skin again and resume breaking.

Eskimo and Indian women patiently chew raw hides for days to break and soften them, but there are quicker, more pleasant ways for the home tanner. Small skins can be worked in the fingers. Pull and stretch the hide in all directions. Rub two parts of the flesh side together briskly. Pull rabbit and muskrat pelts through a smooth iron ring. Or rub the small skin on a dry washboard.

Larger hides are harder to work.

A very practical plan is to nail a board with one edge sharpened horizontally and shoulder high between two posts. Get a man on each end of the hide and draw it across the sharpened edge, bearing down with all the force the hide will stand. Turn skin quarter-way around every few minutes to work and pull it in all directions.

An easier method is accomplished with the tools illustrated in Figures 5 and 6. Figure 5 is simply an old ten-inch mill file with the end ground half-round and partly sharp. Drive file's tang in a block of wood and hold it erect and rigid. Then draw the skin back and forth over the rounded ends. The file must not be sharp enough to cut the skin, but sharp enough to push off loose flesh that may still adhere. Work over every square inch both ways. If a few places dry hard, moisten them and work again. It is possible to completely break a large skin on one going-over with this tool. Be careful with thin, tender hides and go easy around cuts, tears, and tick holes. This tool is unequalled to subdue thick, tough skins.

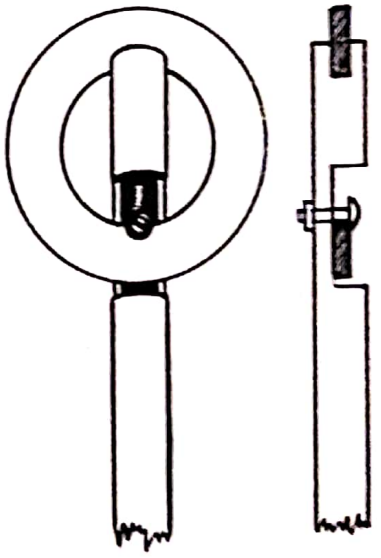

FIG. 6
PIPE and RING BREAKING TOOL

The tool illustrated in Figure 6 can be made in a few minutes and works equally well on both thick and thin hides. It requires a large flat ring as illustrated.

The back of an old hand saw blade makes a good breaking edge. Fasten it in a frame or vice and pull hide back and forth across the back. Or pull the skin across a dull axe blade held in a vice.

The operation known among tanners as "staking", both softens and slicks leather. It is used to finish chrome tanned

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skins in particular and may be employed to soften and smooth any hide tanned without hair. A variation of the regular professional operation can easily be followed by amateurs.

Clamp one edge of the hide between two pieces of squared timber, 2 in. x 4 in. A bolt through each end will hold them tightly together. Hang this 2 by 4 clamp up at head height so the hide hangs down free. Procure a hatchet or light axe head. Dull the cutting edge so it is smooth and rounded, not sharp, and without nicks, notches or sharp corners. The edge should be ground as dull as the back of a common table knife.

Stand facing the hanging hide. Grasp the lower free end with your left hand, press edge of hatchet head with your right against the top of hide close to the 2 by 4 clamp at a thirty degree angle and scrape down the full length of hide, ending where your left hand grips it, pushing the hatchet head edge first against the skin. Go over every part of the hide, repeating the operation until the skin is soft and slick. Stake the grain or hair side only of dehaired skins which have been tanned by any formula given in this booklet. Staking is likely to roughen the flesh side of furs tanned with hair on and is not recommended for them.

BUCKSKIN

Buckskin isn't leather since it hasn't undergone any chemical change, but is raw skin made soft and supple by mechanical working. Genuine buckskin is then treated or "dubbed" with brains and smoked to ensure it drying soft after being wet. For some purposes buckskin is superior to leather. At one time it was the principal material used for clothing by Indians and pioneers. It is still unexcelled for gloves and mittens. Buckskin is also made up into leggings, hunting shirts (Daniel Boone style), jackets, gun covers, moccasins and ceremonial shirts and ornaments for Boy Scout troops.

INDIAN TANNED BUCKSKIN

Indians made buckskin from hides of deer, antelope, moose and caribou. Elk hides were sometimes used but the product was comparatively weak and inferior. The raw hide was first soaked in water until the hair slipped. Deer hair loosens in plain water, other hides require a few handfuls of ashes in the water to hasten loosening. Then the skin was dehaired and grained. The flesh side was fleshed and pared down to uniform thickness. Squaws worked patiently for days to thin the hide

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down until it resembled cloth. Next the wet skin was worked and pulled and chewed. When perfectly supple it was dubbed with the brains of the animal, obtained by splitting the skull lengthwise. The brains were dissolved in tepid water, then simmered with more water to make a thin paste. Lumps were broken up with the fingers until smooth. This paste was rubbed briskly into the hair side of skin.

Finally the hide was smoked over a slow fire of punky wood, Damp willow was often used. Smoking closes pores, making hide more impervious to water, and gives a pleasing light yellow or light brown hue.

Indians kindled a fire in a hole in the ground. About this they set a frame of short poles like a tepee frame. Several hides sewn together were draped about the frame to hold the smoke in. As soon as the desired colour appeared, skins were removed, folded smoke side in, and laid away to season. Sometimes just the hair side was smoked, sometimes both sides.

WHITE MAN'S TANNED BUCKSKIN

The process is similar to the Indian plan, but soap is used instead of animal brains for dubbing. This permits us to tan not only the hides of deer, but also skins of kangaroos, wallabies, possums, calves, dogs, sheep and goats and make a splendid grade of buckskin.

After the skin is dehaired and fleshed, grease the flesh side with bacon fat, old butter, or neatsfoot oil, and hang for two days away from the direct rays of the sun. Then take a good grade of laundry soap and make a pail or tub of fairly strong soapsuds. Home-made soft soap is fine for this purpose.

Soak hide in soap solution until you can easily squeeze water through it. This will take from four to ten days. Keep in a moderately warm place. When water passes through the hide by squeezing, rinse well in clear water, putting hide through a clothes wringer, if possible, to remove all traces of soap. Then break until the hide is dry. If it dries stiff in spots, wet and work over again.

This buckskin will be supple and smooth but will dry out hard after wetting. To prevent this, smoke it. If you have a smokehouse use that. If not, hang hide over top of house chimney, build a slow fire of smoke-forming wood in stove and change hide around to smoke evenly. Do not let the skin become hot.

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TANNING SHEEPSKINS

Sheepskins can be tanned with the wool on, to make coat and mitten linings, collars, rugs, robes, etc. Tanned without wool, they make a good quality of imitation buckskin and may be used for the same purposes. Sheepskins can also be finished without the wool by the chrome tan process into a soft water-resisting leather used for many leathercraft purposes, suede articles, linings for brief cases, purses, wallets, etc. See Chrome section.

TANNING WITH WOOL

Flesh hide carefully and trim off tag ends. Dissolve one pound of good quality laundry soap in two quarts of boiling water. Cool and mix one-half of soap solution with a gallon of warm water. Wash the sheepskin in this solution until soap extracts no more dirt. Then use the other quart of soap in the same way for a second washing. Rinse well in clear water, putting skin through clothes wringer, if possible.

Tan with Formula 1 (see page 22). Soak in soda solution, rinse in clear water and break as directed in Chapter 3.

An alternative formula for sheepskins which avoids soaking the wool and saves trouble is:

1 pound alum — ½ pound saltpetre
Twice the bulk of both of bran

This should be well mixed and spread evenly one-quarter-inch thick over flesh and side of damp skins. Fold hide with wool side out and let lie one week. Moisten with a little water each day to keep hide damp, but not wet. Scrape off the mixture and break until soft. This process does not produce a hide as soft as Formula 1, but serves well enough when supple texture is not required.

If the wool appears soiled and is not perfectly odorless after either of these tanning processes, give it a gasoline bath. This bath, in the case of sheepskins, comes after the tanning operation, not before as with other kinds of hides. Air well and comb out the wool so it lies straight. If the leather part of pelt feels harsh after the gasoline bath, rub flesh side lightly with neatsfoot oil.

Should you wish to use the sheepskin as imitation white fur for baby robes, blankets, trimmings, etc., the wool should be bleached. Procure or build a tight wooden box with sides big

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enough to hold one sheepskin. Such a box will bleach five skins at once, one tacked to each side and one to the top. Tack smoothly with flesh side in - wool out. Don't let top skin sag in centre. Then put a sulphur candle in centre of ground under box, light it and close down. If candles are not available, put a pound of flour sulphur on a tin plate and drop some glowing coals on it. In seven to eight hours the wool will be bleached by the sulphur fumes. Hang the skins in open air until the sulphur smell has left.

If you wish to colour the wool pelt, use common commercial dyes for wool and follow directions on package.

Goat skins may be handled by any of the above methods, but as a rule goat hides are more useful tanned without hair as is explained below.

TANNING WITHOUT WOOL

If you do not care to save the wool, remove it as directed on page 3, under "Dehairing". If you wish to save the wool, clip or shear it off close to the skin. Then loosen the roots by coating the flesh side of the skin with a thick paste of slaked lime, hardwood ashes and water, in the following proportions:

1 part ashes $\frac{1}{2}$ part slaked lime
Water to make a thick paste

Then roll up the hide and lay it away in a warm room, testint it every few hours to see if the short wool has loosened enough to be scraped off. Or, you may use the regular dehairing solution described on page 20, and soak the hide. Wool can also be loosened with the following solution:

1 pink slaked lime 1 gallon soft water

Put the hide on fleshing beam and remove wool and grain. Flesh off opposite side. Put through a bate (see page 20) if the wool was loosened with a solution containing lime. Then follow the method given for making buckskin on pages 27-28, breaking, soaking in soap and smoking, or use Formula 1, page 22.

FUR ROBES AND RUGS

The hides of cattle, horses, calves, sheep, dogs, etc., can easily be tanned with the hair on to form attractive warm rugs or robes. It is important that such large hides be salted. Salt must strike through the flesh side and set hair and epidermis before they loosen and slip. If the hide is very fat, salt does

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not penetrate readily. In such case, immediately after skinning, flesh the hide carefully and, by scraping with the edge of your knife, press out as much of the oil as you can. Then lay hide flat on ground and spread dry salt evenly over every part. After salting, fold the hide flesh to flesh and roll up.

If hide has been cured dry, relax or soak in warm water, borax and soap chips. Use a handful of soap chips and one-quarter cup borax to five gallons of water. Stir well and soak hide until soft. Then lay it on fleshing beam and go over with fleshing knife to press out as much water as possible. Scrape hide free from flesh and tissue. This fleshing helps to break up hard spots which might otherwise tan hard. If hide is very fat, degrease with gasoline bath.

Make the following solution:

1 gallon water — 1 pound salt
1 pound alum

Heat water to dissolve salt and alum. Cool, and add:

½ ounce sulphuric acid — 4 ounces hyposulphite soda
4 ounces formic acid — ½ pint dry flour

Leave hide in this solution for ten hours. Then squeeze excess liquor out and fold skin to flesh and roll up with hair side out. Let lie for twenty-four hours. Then hang flesh side out over a line or pole to dry. When about half dry, lay hide flat and paint the flesh side evenly with the following mixture, applied warm:

1 quart water
½ cake laundry soap shaved fine
Same bulk as soap of shaved stearic acid
1 ounce carbonate soda
4 ounces neatsfoot or castor oil

Boil and stir until ingredients are dissolved. Cool, and add one tablespoonful commercial ammonia.

The hide must not be dry when this liquor is applied, but should be half wet. Warm the liquor and apply with soft brush. A large skin like horse or cow may require two applications. This is a splendid fat liquor to dress and soften any tanned skin. When applying any fat liquor or oil to a hide tanned by any method, apply enough to make the skin soft but not greasy. This knack will soon come with experience. It is better to apply too little and then, if, after breaking, the hide refuses to soften as much as it should, to give the skin another light coat of oil or fat liquor and break again.

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Let the hide dry, and then swab the flesh side with water. When wet all over, roll up and let lie an hour. Then stretch and pull, breaking by any of the methods described on pages 25, 26, and 27, until the skin is completely soft. When worked cover hair side with dry sawdust or corn meal and beat lightly and rapidly with a flexible wand. If the hair is soiled or dull, rub it with a wad of bag moistened with kerosene, then sprinkle with sawdust and beat. This cleans and glosses the hair.

Let hide hang up until bone dry. Sandpaper the flesh side until it is smooth. This also helps soften any stiff places. Now moisten hide again and tack to the floor, stretching into natural shape in the case of a rug, and into square or oblong shape for a robe. Trim outside edge evenly, using sharp knife. Never use scissors. Brush hair carefully, remove tacks, dust dry talcum powder on flesh side and rub it in well. Sew up cuts and tears.

Any size or variety of small skin can be made up into a rug or robe by using more than one hide. A full-sized robe will require from four to eight sheep, calf or goat hides, from six to ten dog hides, twelve to twenty fox hides, and from twenty to twenty-five possum hides.

If several small hides are used, cut and trim them into uniform size. If the hides have a dark centre line, get this in the middle of each. Sew together with carpet thread and leather needle. Sew from back of skins using the overhand stitch.

Rugs and robes usually have borders consisting of one or two layers of felt strip, three inches wide, sewn around the outside. The edges of these strips are pinked (scalloped). If double, the lower felt is three-quarter inch wider than the upper strip and usually of a contrasting colour. Sew borders on from the back, running needle obliquely through with a short stitch on fur side and a long one through the felt. If bits of hair are caught in the stitch, pick out with an awl.

Baste an inner lining of cotton sheet wadding on the under side of rug and then cover with felt or plush. The edges of this lining must be turned under and sewn to the border with a stitch the reverse of that used in sewing border to rug.

Rugs for floor use may be lined with canvas which stands wear and is easier to procure in wide widths.

Any large skin can also be tanned into a robe or a rug with Formula 1 described on page 22

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TO TAN A BULLOCK OR LARGE KANGAROO HIDE

The instruments necessary are the same as in the small skins and the dehairing of the skins is done in exactly the same way as other small skins, in lime.

After the skins have been limed and the hair removed and the backs fleshed with a flesher or a beam, it has then to be bated. This can be done with fowl manure or with specially prepared bates sold by the trade, but I would usggest that fowl manure will do excellently.

Care must be taken that the hide is not left in the bate more than 48 hours, as it will then begin to rot and the hide will be spoiled. The bating is only done to open the pores of the hide so that when the hide is put into the tanning material there will be an opening for the tanning material to go through the fibres.

After the hide has been dehaired and bated, it must be thoroughly soaked in water, and cleaned before putting into the tanning material. The tanning material used for this job is an extract of bark. This can be purchased in the form of a solid extract. The extract is obtained by bruising the bark of the acacia trees or the wattle trees here in Australia. The bark is then leached and the liquid obtained is dried and sold as a powder, but quite good results can be obtained from local bark if they contain tanning material.

The solution used to start the process is like weak tea, and the strength gradually increased until the tan has penetrated right through the hide. The solution which is used to finish the hide off, should be as strong as pretty strong tea. There is no definite way of gauging this strength, except by the look and smell of it.

By taking off a piece of the hide and looking for a green centre from time to time, it can be determined how far the tan has struck through. When the tan strikes through to meet in the middle, it is then ready to be taken out.

Take the hide out and hang it over a beam till it is drained, then peg it out upon a large board floor and give it a coat of ordinary mutton fat brushed well over. This can be put on warm. Also it is advisable to mix with the mutton fat a small quantity of neatsfoot oil. Neatsfoot oil can be obtained from the fleshings originally cut off from the hide. (By boiling).

After the hide has almost dried and the oil has dried into the hide it will be necessary to work it over a beam to keep it soft and also to dress it again with bullock or sheep fat and oil.

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TANNING KIP

The foregoing method of tanning is most useful for kips; it is not suggested that this could make sole leather as this needs very strong rollers and a more up-to-date plant.

TANNING KANGAROO, CALF ETC.

If the foregoing method of tanning is being used to tan kangaroo, calf, or other small hides, the finish will require to be done a little differently from the bullock hide.

After the skin has drained out of the liquor, it must be pegged tight on a wooden frame, and before being allowed to dry, paint it with a mixture of mutton fat and neatsfoot oil.

If this first application of fat and oil dries in and leaves the hide too dry, give it a second coat.

LIST OF MATERIALS REQUIRED FOR BARK TANNING

1. Lime for dehairing
2. Chemical bate or fowl manure for bating
3. Bark extract for tanning
4. Mutton fat and neatsfoot oil for oiling

WATERPROOFING FOR BOOTS AND SHOES

Here are six good formulas to waterproof leather boots and shoes. All can be easily prepared at home.

1. Heat one pint of tallow. Hold a six-inch square of auto inner tube with pliers and apply match to lower end so rubber melts and drips off into the tallow. Stir well and apply warm.
2. Mix equal parts of paraffin and neatsfoot oil.
3. Mix equal parts beeswax and neatsfoot oil.
4. Mix equal parts beef or mutton tallow and neatsfoot oil.
5. Mix two parts pine tar and three parts cod-liver oil. Boil together to blend.
6. Mix two parts vaseline and one part paraffin.

Both leather and compound should be warmed to apply.

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The art of plaiting leather confronts the novice with requirements that must be realised from the start to achieve the desired results.

By following the step by step illustrations and instructions, the learner will easily master the contents of this book, but most important, should understand the basic principles involved.

Once these fundamentals are understood, many other types of plaiting can be done without reference to any manual of instruction.

All work should be critically inspected as it progresses, to determine the reasons for any faults, and to establish working procedures that will eliminate them.

Uneven tension is the most common cause of bad plaiting, and a standardisation of manual operation, and skill in left and right handedness, must be devloped to overcome this.

Systematic, orderly, painstaking effort is required to produce results, but the many beautiful and useful articles that can be made, make this traditional hobby well worth while.

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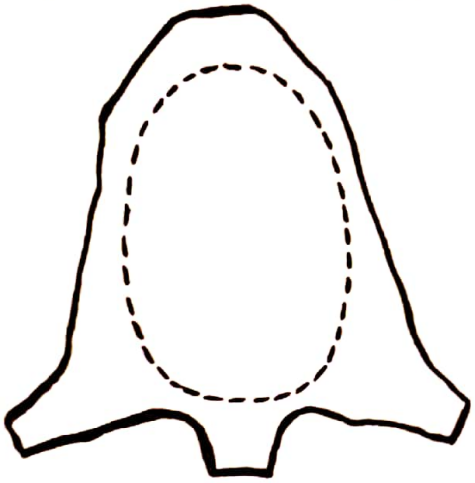
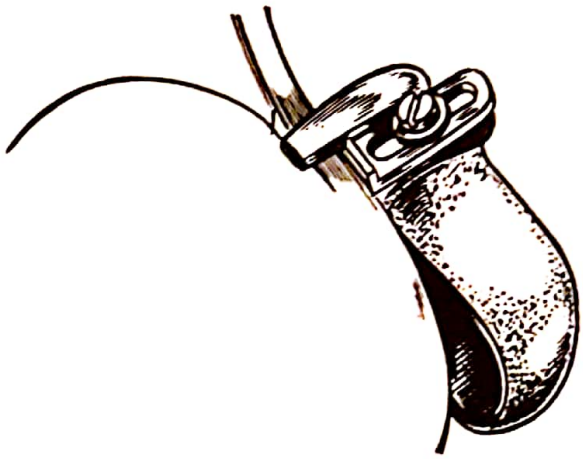
Care should be taken in choosing the right type of hide for plaiting. Kangaroo of medium weight from $\frac{3}{4}$ to $1\frac{1}{4}$ lb is best, having firm grain and even weight. The light hides stretch too much and the heavy hides are too coarse.

Having selected a medium size hide suitable for the job in hand, cut around the outside of the hide, as shown:





Leave the flanks and the coarse butt of the tail for other purposes, it is of no use for plaiting.

To strand the hide, use a mechanical strander such as illustrated here, working around and around the hide until the centrepiece is too small to get around properly. The centrepiece can be used for keepers on whip handles and pouches,

Having stranded the hide, proceed to stretch the strands by pulling to and fro over a door handle or pulling sharply between the hands, taking care that the strand is not broken.

When the hide has been stranded, it often needs skiving for thickness as well as width, and the easy way, or shall we say the simplest way, it to cut a groove into a piece of wood $\frac{1}{4}$" deep and the width of the hide to be split ... put a stout razor blade at the required thickness and get someone to pull the hide through.

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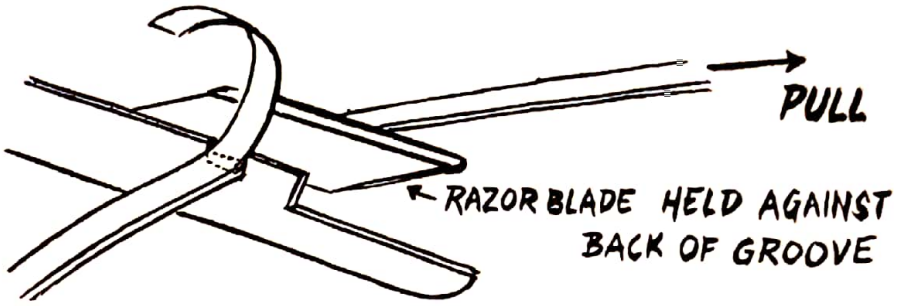
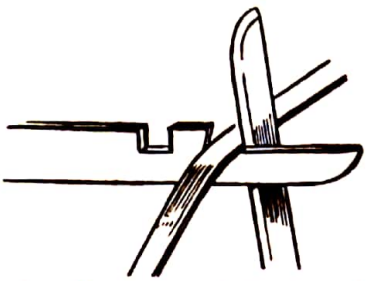


Or the hide can be pulled through an ordinary spoke shave, perhaps the best means for an amateur.

If required for special work, additional stretching can be obtained by wetting the hide and pulling between the hands, or pulling around a post.

As regards the piece of wood on which the hide is gauged for width, you will note the slight undercut where the hide runs through. This is to keep the inside edge down. This is very important, as otherwise the job does not turn out even for width.



For special work such as making a whip, the edges of the strand have to be sliced off, taking the bottom left hand corner off the hide and the top right hand edge off the hide, which lets the hide lie down evenly in the whip.

For ordinary belts and hatbands, this is not necessary.

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FOUR PLAIT ROUND

Take a ring, snap hook, or any suitable fitting and hang it on a hood, or tie it to a fixture on a wall.

All plaiting should be done in a standing position, and with the hands not lower than waist height. This allows the plaiter to get even tension on the work, either by pulling down, or leaning back.

Two strands of equal length are used and these are doubled, and their mid points crossed over the ring as in fig. 1. The strands will be shortened by about a third in plaiting, so allow for this, and also 4" to 6" for plaiting back or finishing the other end.

In fig. 2, Strand 1 is brought from the back, and crossed over Strand 3. Bring 4 around the back and over 1 (fig. 3). Bring 2 around the back and over 4 (fig. 4). Tighten the work up carefully and it will appear as in fig. 5. From now on, the sequence is as follows: The top left strand passed around the back and then under one strand and over one as in fig. 6. The top right strand around the back, under one, over one (fig. 7).

Continue this sequence, always alternating left and right hand strands, until the desired length of plaiting is achieved.

This plait can be made quite attractive by using 2 strands of contrasting colours.

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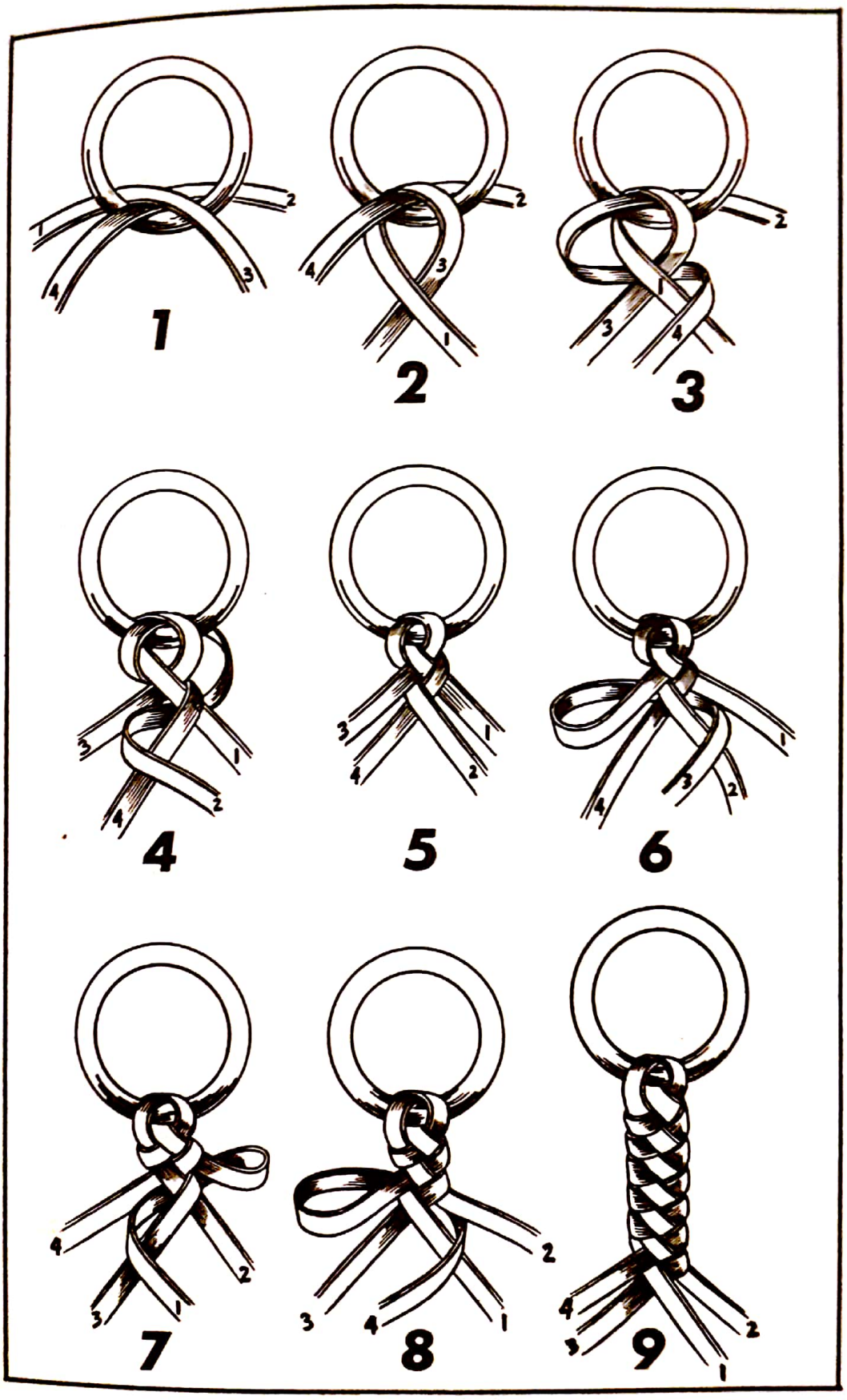

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FOUR PLAIT TURKS HEAD

Arrange the 4 strands exactly as in fig. 1. Hold the strands firmly in this position, and turn the plaiting upside down, so that all the loose ends are pointing upwards.

In fig. 2, Strand 4 is laid out and to the left, flesh side up. Strand 2 is twisted slightly, and laid across Strand 4, towards the front, flesh side up. Strand 3 is laid out and to the right. Strand 1 now lies across 3, and is twisted to the right as shown in fig. 2.

Make sure that Strand 1 and 2 are lying down neatly before proceeding to weave the crown knot. Lay Strand 2 between 1 and 3, to form a loop as shown in fig. 3. Pass 3 over 2 to form another loop (fig. 4). Pass 1 over 3, and then 4 over 1 and through the loop formed by thong No. 2 (fig. 5). All the strands are now locked in position as in fig. 6, and can be tightened gently.

In fig. 7, thong No. 1 passes around 2 and up through the centre, moving anti-clockwise. Thong 3 then passes around 4 and up through the centre (fig. 8).

To complete the Turk's Head, pass 2 around 1 and through the centre; and lastly 4 around 3, and through the centre. Cut off the protruding strands, as close as possible to the knot, and finish off by wetting and rolling.

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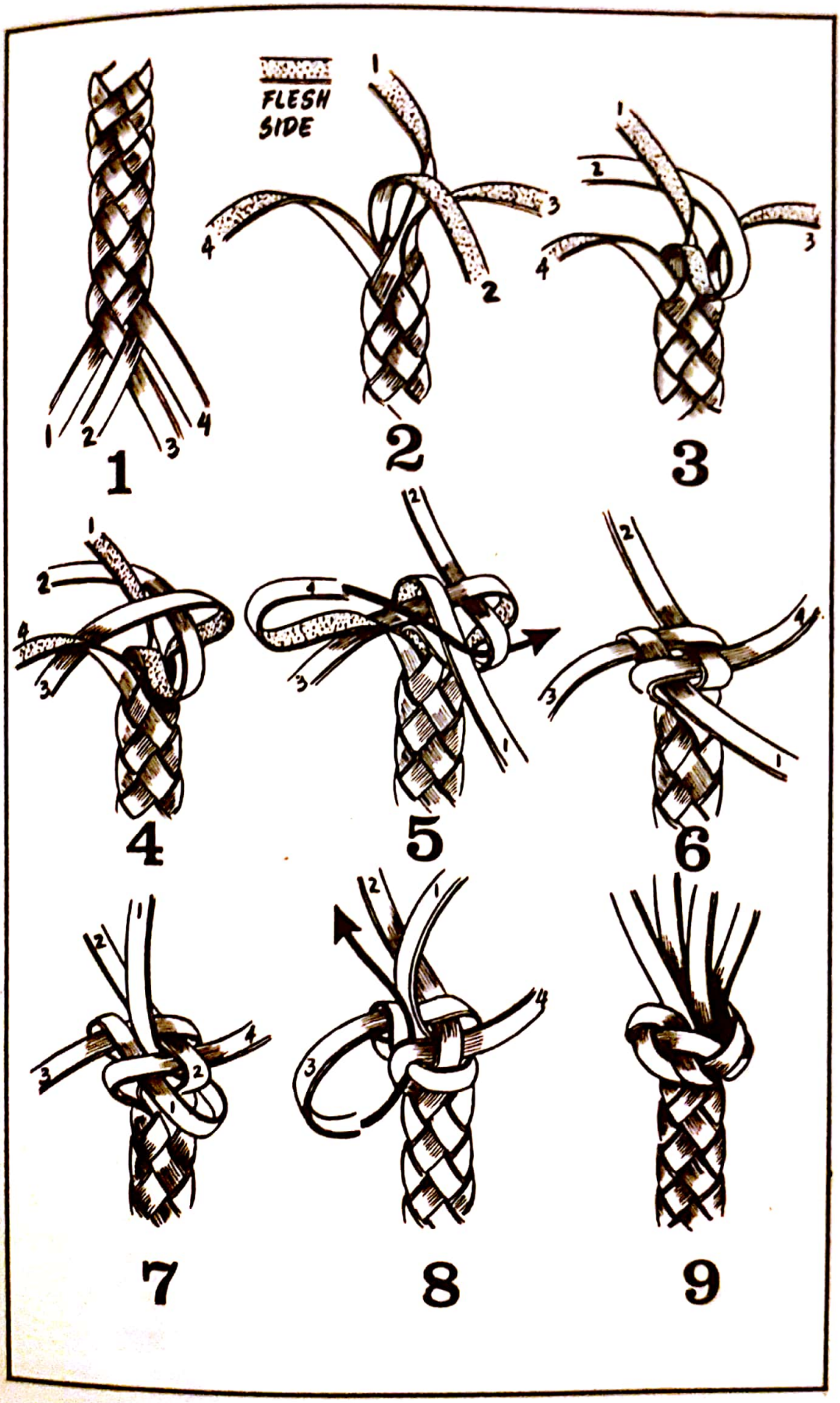

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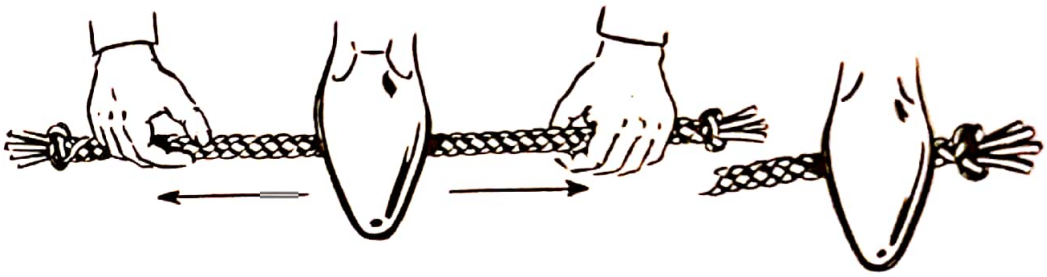
The plaited strand should be rolled under a board or foot to smooth out any unevenness and to equalise the tension on the strands. When rolled sufficiently the plaited strand should equal the width of the strands from which it is made.



A most satisfactory method used by some whipmakers, is to roll the finished plaiting on a slab of marble, using a heavy piece of smooth wood. A block of hard wood measuring 4" x 4" and 12 to 18 inches long, with rounded corners is ideal for heavy work, while a lighter piece, such as an old bread board, is better for fine plaiting.

Make sure that the surfaces are clean, otherwise the plaiting will be soiled and discoloured.

The four plait round is the integral part of all round plaiting, and should be mastered before any further steps are attempted. The four plait round is used in the belly of a whip, and apart from round straps such as watch fobs, key straps, hatbands, lanyards, it is used to make up the component parts of bridles and such articles. Plaited with fine strands the finished plaits can be again plaited together with very good effect. In this way a very substantial plait can be achieved.

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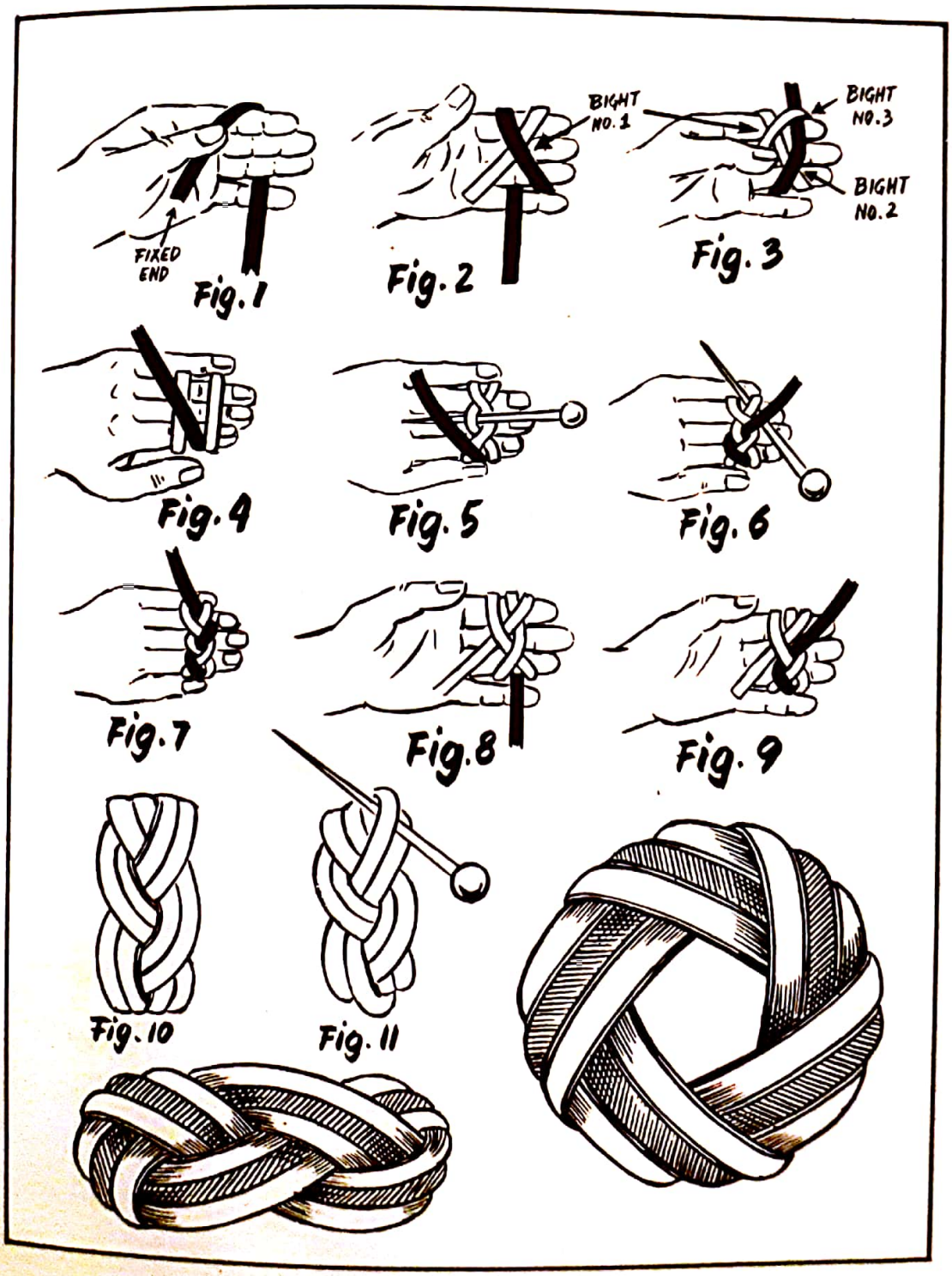
SINGLE KEEPER KNOT

The illustration shows a simple knot used in the construction of a Neckerchief Turk's Head Slide. By following the plan as set out in figures 1 to 11 this article is simply made.



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SIX PLAIT ROUND

There are two types of 6 plait round illustrated.

Figs. 1 to 6 show an over one, under one sequence, while figs. 7 to 12 illustrate a combination of under two over one, and under one over two.

This may sound complicated, but is really easier and quicker than the first method.

Both plaits should be worked over a core, and the 4 plait round is often used for this purpose.

In fig. 1, the 6 strands are spaced equally about a core, and secured with a short length of twine. Strand No 2 is crossed over No 1, and strand 4 brought around from the back, over strand 5, under 6 and over 2.

In fig. 2, strand 5 passes from the back, in the opposite direction, over 3, under 1, and over 4.

Fig. 3. Strand 3 passes around the back, over 6, under 2, over 5.

Fig. 4. Strand 6 passes around the back. over 1, under 4, over 6.

From now on, the sequence as shown in figs. 5 and 6, is that the top right strand is taken around the back, then over one strand, under one, and over one, then the top left strand around the back, over one under one, over one.

The second method is started as in figs. 7, 8, 9 and 10.

Then the top right strand around the back, under two strands, and over one (fig. 11).

The top left strand around the back, under one, and over two strands (fig. 12).

Continue this sequence, alternating under two, over one on one side, and under one, over two on the other side.

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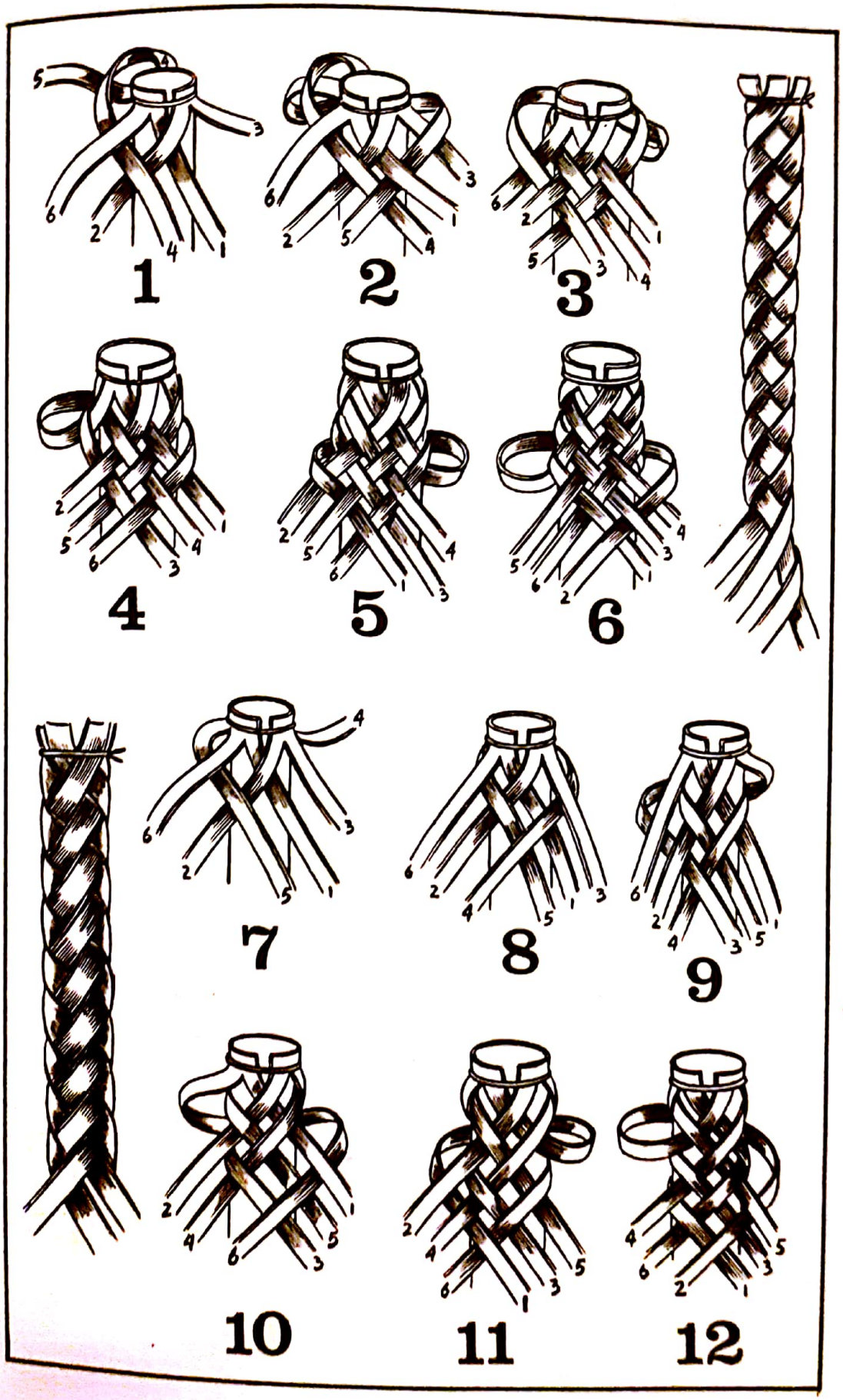

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EIGHT PLAIT ROUND

Eight strands are spaced equally about a core, and tied, as shown in fig. 1.

The four strands on the left are shown black to make the drawings easier to follow, but this is not recommended in actual practice, as there are many other more attractive designs.

In fig. 1, strand 7 has been brought from the back, under two strands, and over two strands.

Also strand 8, moving in the opposite direction, under two, over two.

Similarly in fig. 2, strand 5 passes around the back, under two, over two.

In fig. 3, strand 6 is taken around, under two strands and over two.

This sequence of under two and over two, is repeated exactly in all the following drawings.

Fig. 4 shows the highest strand on the left (strand 3) passing around, and under two, over two.

Fig. 5. The highest strand on the right (strand 4) passes around, and under two, over two.

Repeat the sequence as shown in Figures 6, 7 and 8.

Appearance of the finished Plait is shown in the last drawing, also the whip handle illustrated below.

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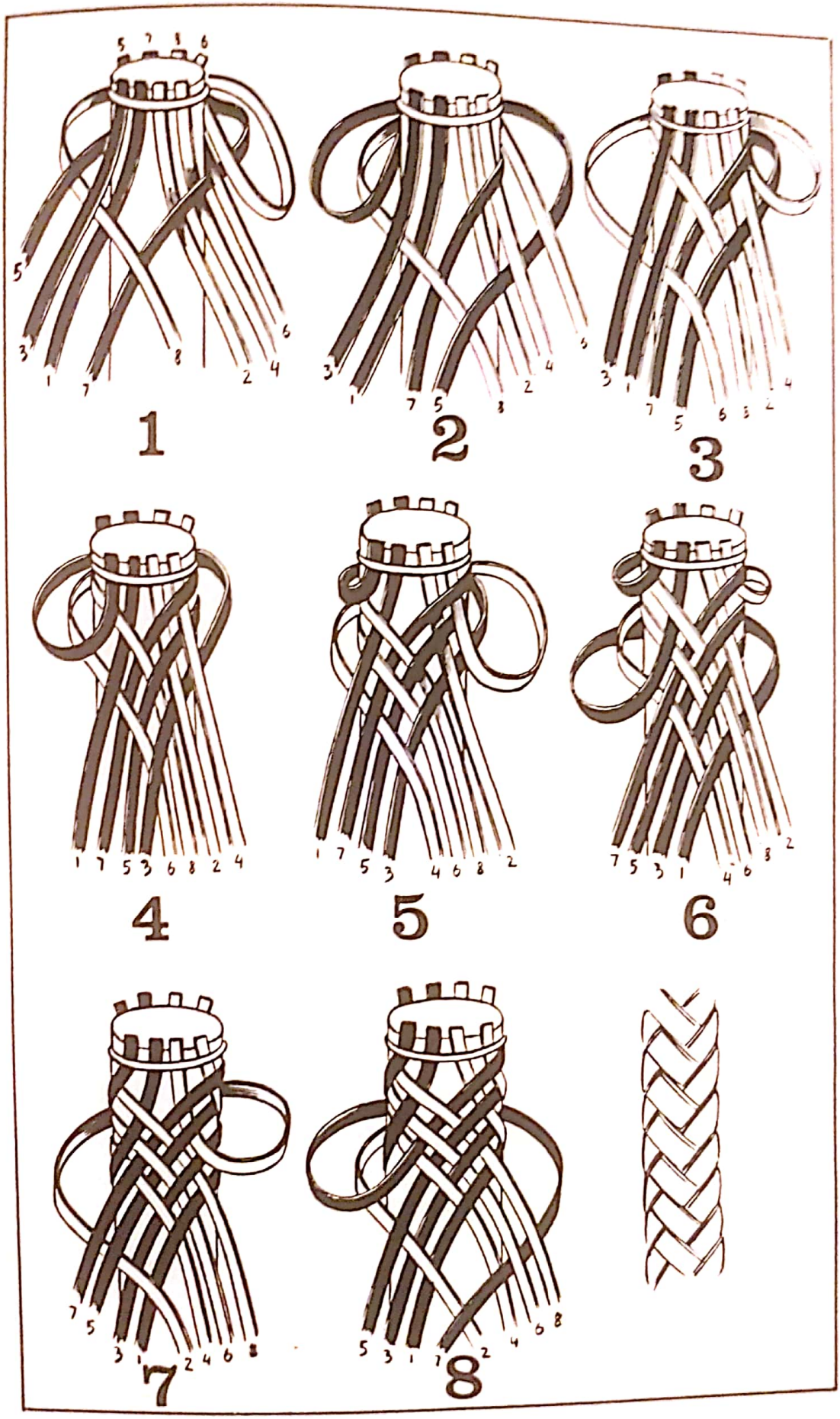

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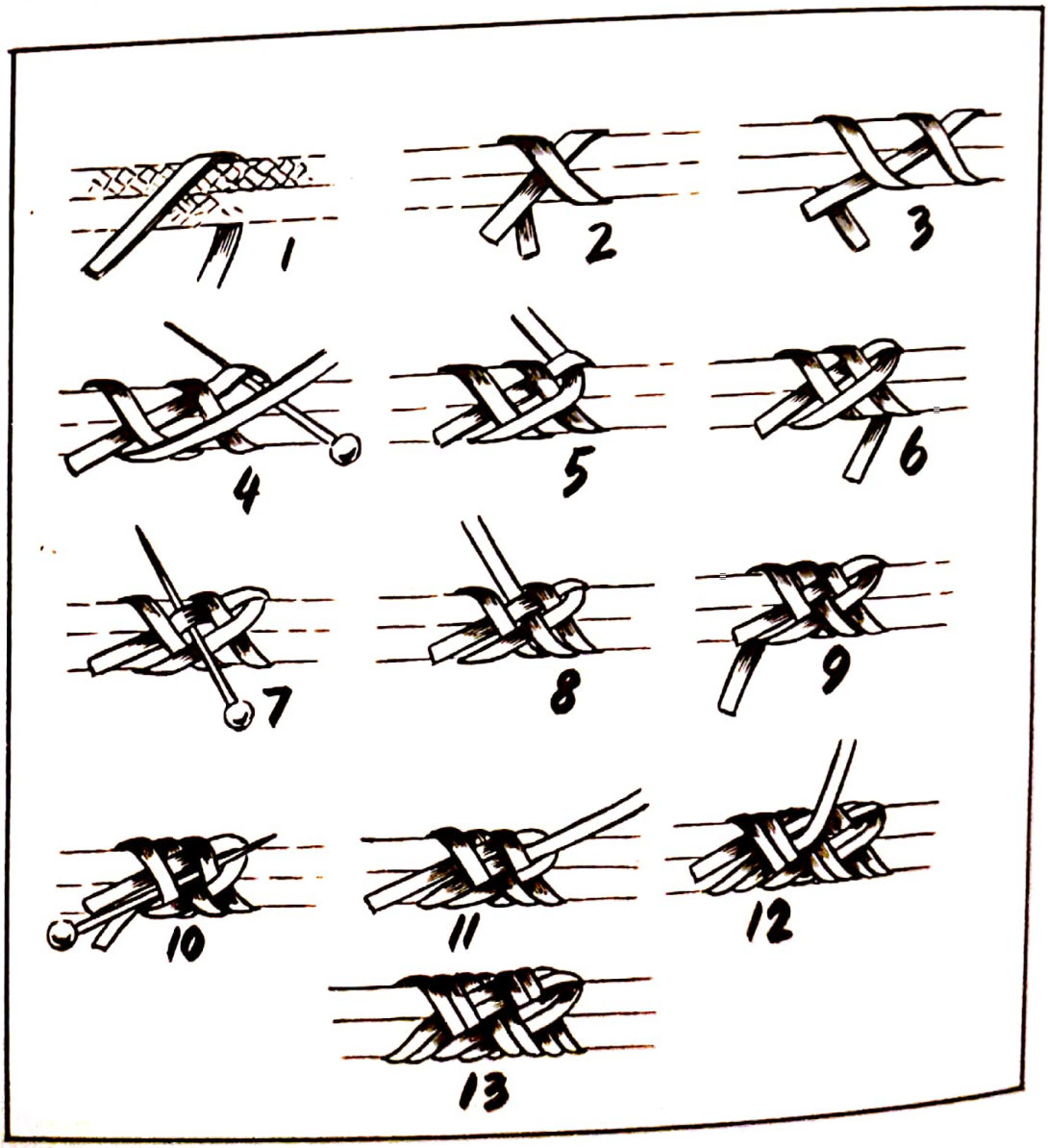
THE SLIDING KNOT

The sliding knot is an essential element in leather strand plaiting. Its purpose is to unite two round plaits and to hold them in position, also to permit making adjustments for length. Figs. 1 to 13 show a sliding knot as tied to unite two strands of four plait round.

Form a single strand structure as shown in Figs. 1 to 10, then parallel the single strand, see Figs. 11, 12 and 13.



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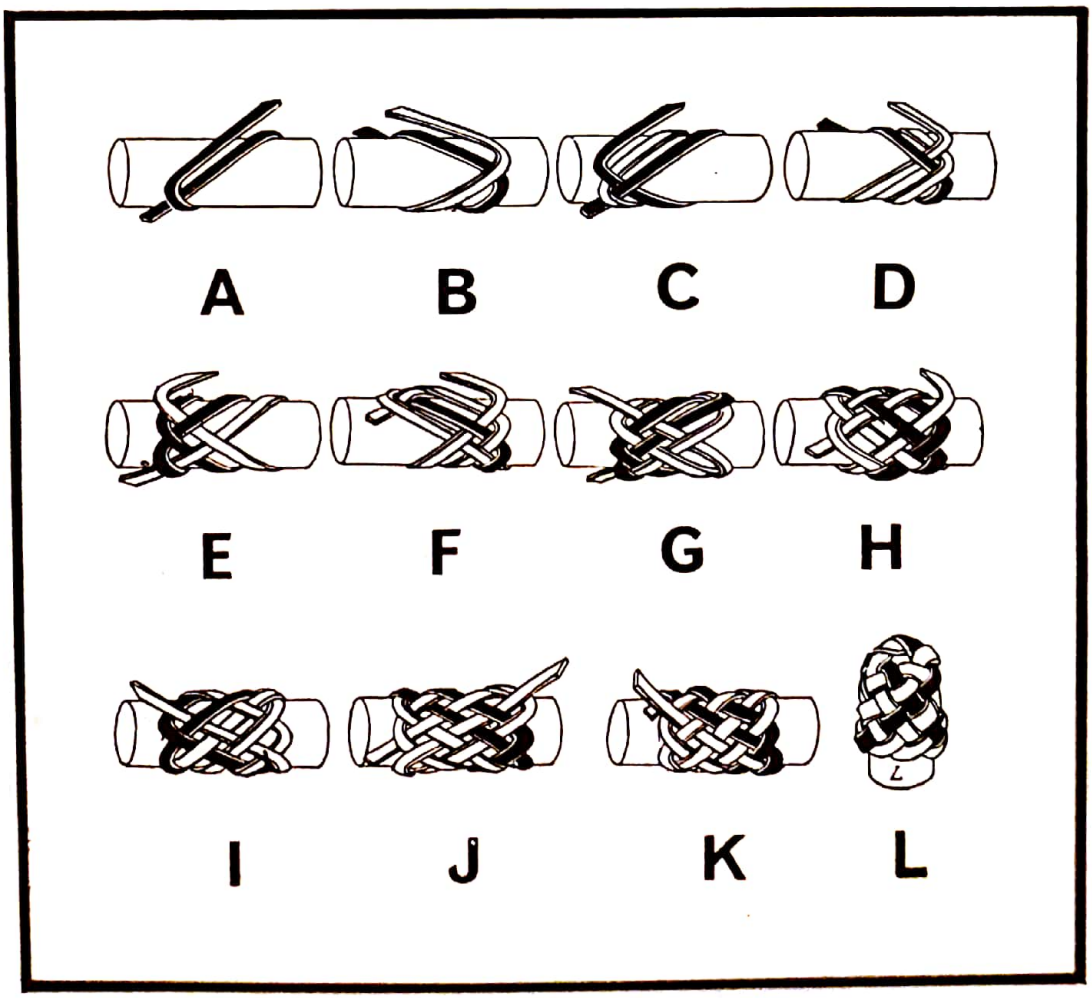
SIX BIGHT TURKS HEAD

The construction of the six bight knot as shown in Sketches A to L. This knot is tied over a mandrel or core which should be rotated as the knot is developed. The construction indicated by Sketches A and B is done with the core in one position. Rotate the core forward almost one half-turn to bring the strands into the position shown in Sketch C. Again rotate the core and complete the construction indicated by Sketch D. Continue to rotate the core and complete the construction indicated at each position by Sketches E to K. This knot may be shaped to fit over the end of the core as indicated by Sketch L.



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THREE BIGHT KNOT

Single Length

The construction of the Three Bight Knot is illustrated in Sketches 1 to 7. The single strand structure is shown in Sketch 8. This knot may be enlarged to cover more surface by paralleling the single strand structure, shown in Sketch 8. The appearance of the knot after the paralleling process is shown in Sketch X. Notice each strand is double the width of the single strand structure. This process may be continued by paralleling the double strand structure as shown in Sketch A1, which makes each strand three times the width of the single strand structure.

This knot is used at the top of a whip handle. It is equally effective as a protective covering for the end of a cane awl handle and handles of other hand tools.

You will find this Turks Head one of the most useful, because it is easy to learn and memorise, and as it can be tied quickly it is often used in commercial plaiting.

Notice that nearly four turns around the core are made before it is necessary to pass under a strand, and then the last movement to complete the knot (fig. 6) ties the whole knot together.

This knot holds its shape well when used as a sliding keeper on chin straps and hat bands.

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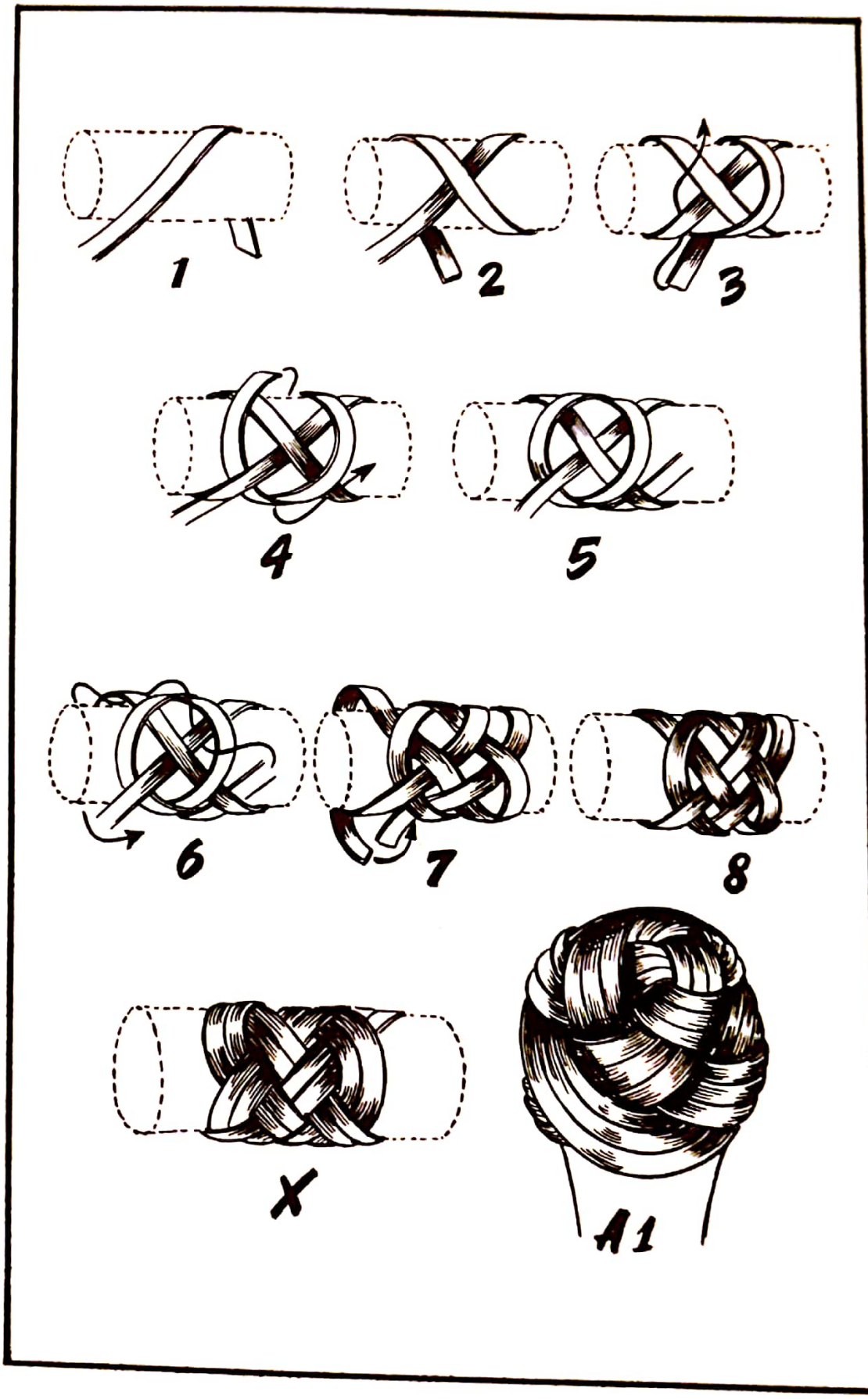

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DOUBLE LENGTH KNOT

The three bight knot detailed in Sketches 1 to 7 on the previous page we will call the unit length knot for purposes of comparison. The three bight knot detailed in Sketches 1 to 12 we will call the double length knot. Refer to Sketches 1 and 2 on previous page and note that unit length three bight knot is started with *one turn* of strand around the core. Refer to Sketches 1 and 2 opposite and note that the double length three bight knot is started with *two turns* of strand around the core.

The construction of the three bight double length knot is illustrated in Sketches 1 to 15. The mandrel or core on which knot is formed - see Sketches 1 to 5 - has not been moved. However, in Sketch 6 the core has been turned forward almost one-half turn to show more clearly the path of the strand on the under side of the core. Sketches 5 to 9 are shown for the new position of the core. Again rotate the core forward about one-half turn and bring it into the position shown in Sketches 10 and 11. Again rotate the core forward and bring it into position shown in Sketches 12 and 13. Rotate the core forward again, bringing it into position shown in Sketch 14. The single strand structure is shown in Sketch 15. This structure may be paralleled as described for the unit length knot, and also may be drawn over the end of a core as shown on Sketch A1, Page 53.

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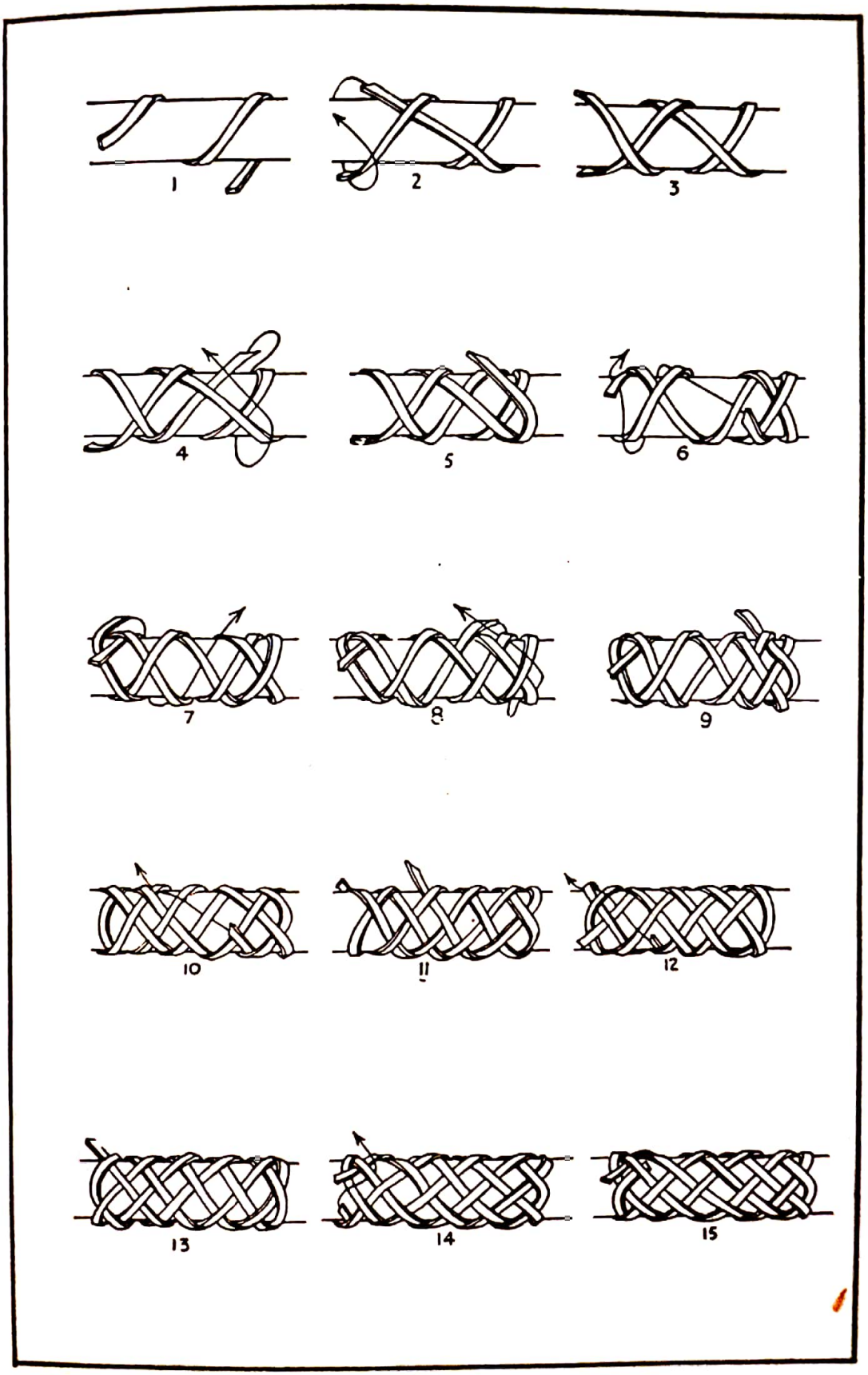

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FOUR BIGHT KNOT

This knot, and the following Turks Head (Pages 58, 59), are executed in a similar manner, and having mastered the principle involved, you will be able to cover any circumference using almost any width of strand.

The only difficulty encountered is that of keeping the turns of the strand in place until the weaving has advanced sufficiently to hold the knot firmly.

You can use a single wide strand to tie the four bight knot, or double or triple the knot as illustrated. Sketches 1 to 7 show construction details.

Sketch 8 shows the completed structure and the start of the paralleling operation. In case the double strand knot does not close up all the open spaces, parallel the double strand structure and obtain a triple strand knot.

Alternatively, the sequence of weaving can be continued as many times as required to cover the core, making sure that you finish with a complete knot.

You can determine this by seeing that the working end of the strand comes back to the starting end, and in such a manner that the sequence of plaiting is correct. For example, see in Sketch 8 that if the working end had been spliced to the starting end instead of paralleling, the over-one under-one sequence would have been perfectly observed all around the knot in every direction.

This four bight knot is used in Whip Making, both as an ornament and also to conceal a splice or the end of the plaiting on a handle.

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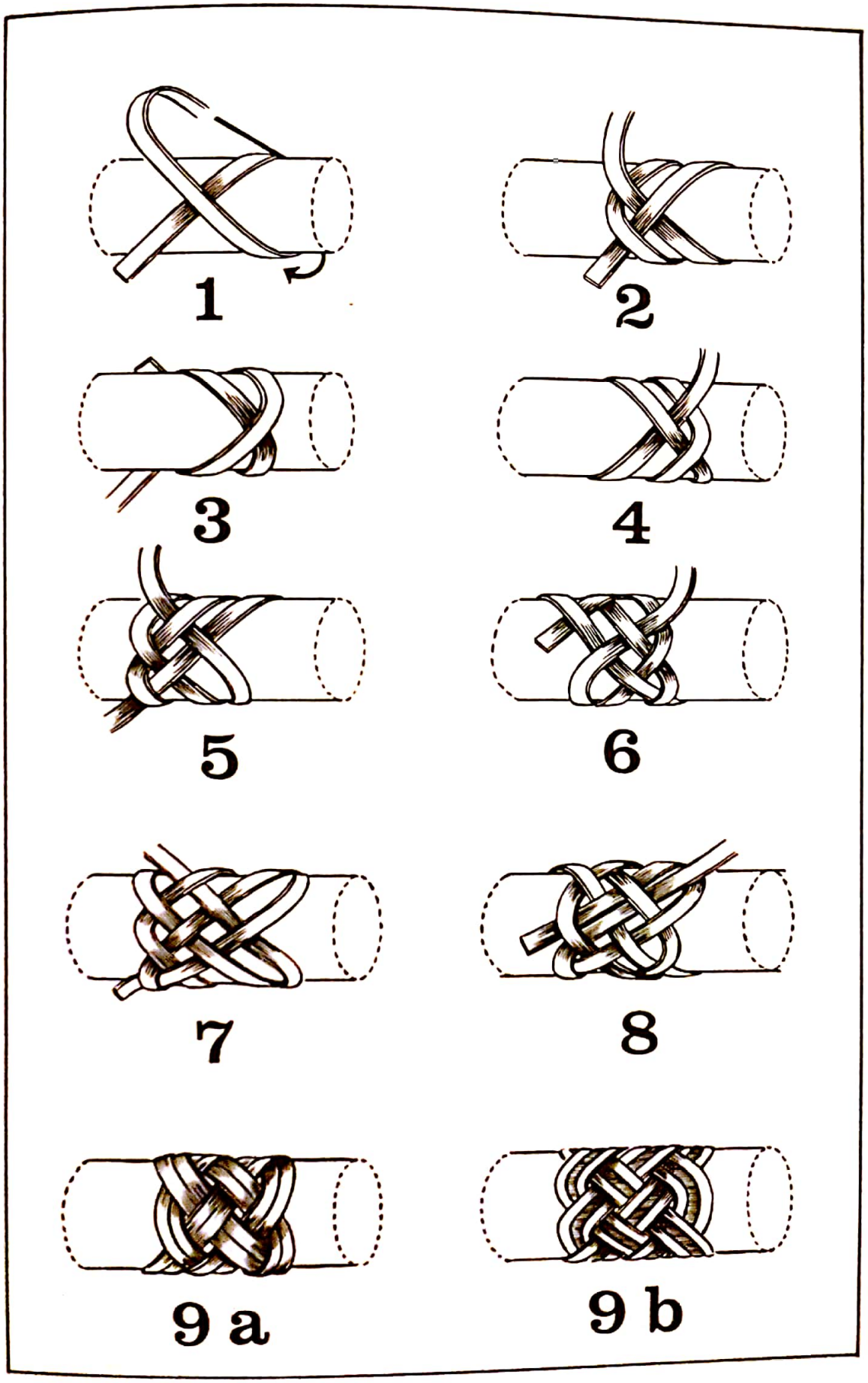

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EIGHT BIGHT TURKS HEAD

This knot can be built up from the 4 Bight Turks Head on Pages 56, 57. Fig. 10 is in fact a complete 4 Bight Turks Head. Similarly, Fig. 14 is a completed 6 Bight Turks Head, and the 8 Bight Knot is shown in sketches 21 and 22. The knot can be enlarged indefinitely to form a 10, 12, 14 Bight knot, etc.

These knots are often formed over a tubular piece of leather that has been sewn together with waxed thread.

The thickness of the leather affords an edge which holds the strand in place during the construction of the knot.

The formation is as follows:

(1) Make a diagonal loop around the core as indicated in Sketch 1.

(2) Carry the strand across the end and parallel the loop following upwards on the lower side, see Sketch 2.

(3) Cross the strand over the first loop and parallel it downwards on the upper side, see Sketch 3.

(4) Repeat the operation, paralleling on the lower side of the strand structure when following upward and after the crossover (see Sketch 5). Continue paralleling the upper side (see Sketch 6). When following downward the design followed is the basket weave or over-one, under-one pattern.

(5) Continue the weaving process until the whole core is covered. The appearance of the knot just prior to paralleling for the last time is shown in Sketch 18. It will be noticed that the space between the first and last strand will be filled by the addition of a single strand. Also the strands crossing this space are alternatively under-two and over-two. The last strand will split these pairs and complete the over-one, under-one patterns. This is indicated in Sketches 19, 20, 21.

(6) End the weaving by making the ends of the strand secure with the junction near the centre of the knot.

(7) Remove slack and adjust length of loops with a martin spike.

(8) Trim off the ends of the strand and roll under a board to smooth out any uneveness and give the knot a uniform appearance.

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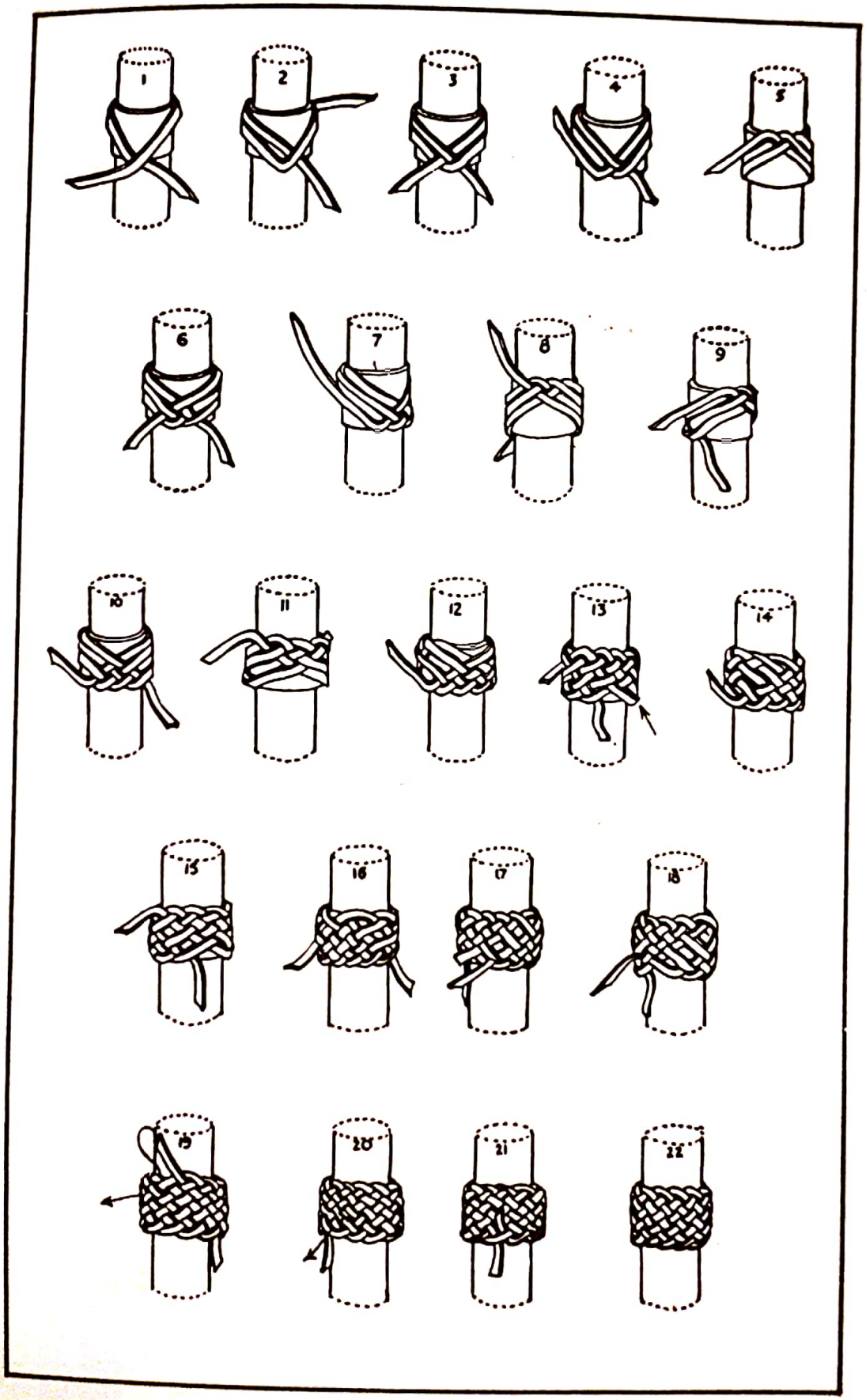

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SIMPLE SINGLE STRAND COVER KNOT

The seven bight knot is illustrated in Figures 10 and 10A. Sketches 10 (C to N) show the construction details. Sketch 10B shows the circumference of the core divided into three equal parts, No. 1-2-3. The core is rotated as the construction of the knot progresses and the portion visible is indicated by the part number that is uppermost in each sketch. Sketches 10 (C to F) show the construction of a four bight three strand knot.

This knot, if paralleled, would yield a knot similar in appearance to the two bight knot. However, instead of paralleling the single thong structure the fourth strand is woven into the three strand structure as shown in Fig. 10G. The left hand sketch indicates by the arrow marked line the path of the strand. The right hand sketch shows the strand in place.

The principle follows - The fourth strand is woven into the three strand structure by crossing over two and under one.

Sketches 10 (H and K) show a continuation of this principle which applies only to the laying in of the fourth strand. The left hand sketch in Fig. 10L indicates the path which the fifth and last strand takes. The right hand sketch shows the strand in place.

The principle follows - The fifth strand is woven into the four strand structure by crossing over two and under two. Sketch 10M shows a continuation of this principle. The knot will be complete when the strand is passed through the structure as indicated by the arrow marked line Sketch 10N.

After removing all the slack and rolling the knot, trim the thong ends off close to the strands from which they emerge.

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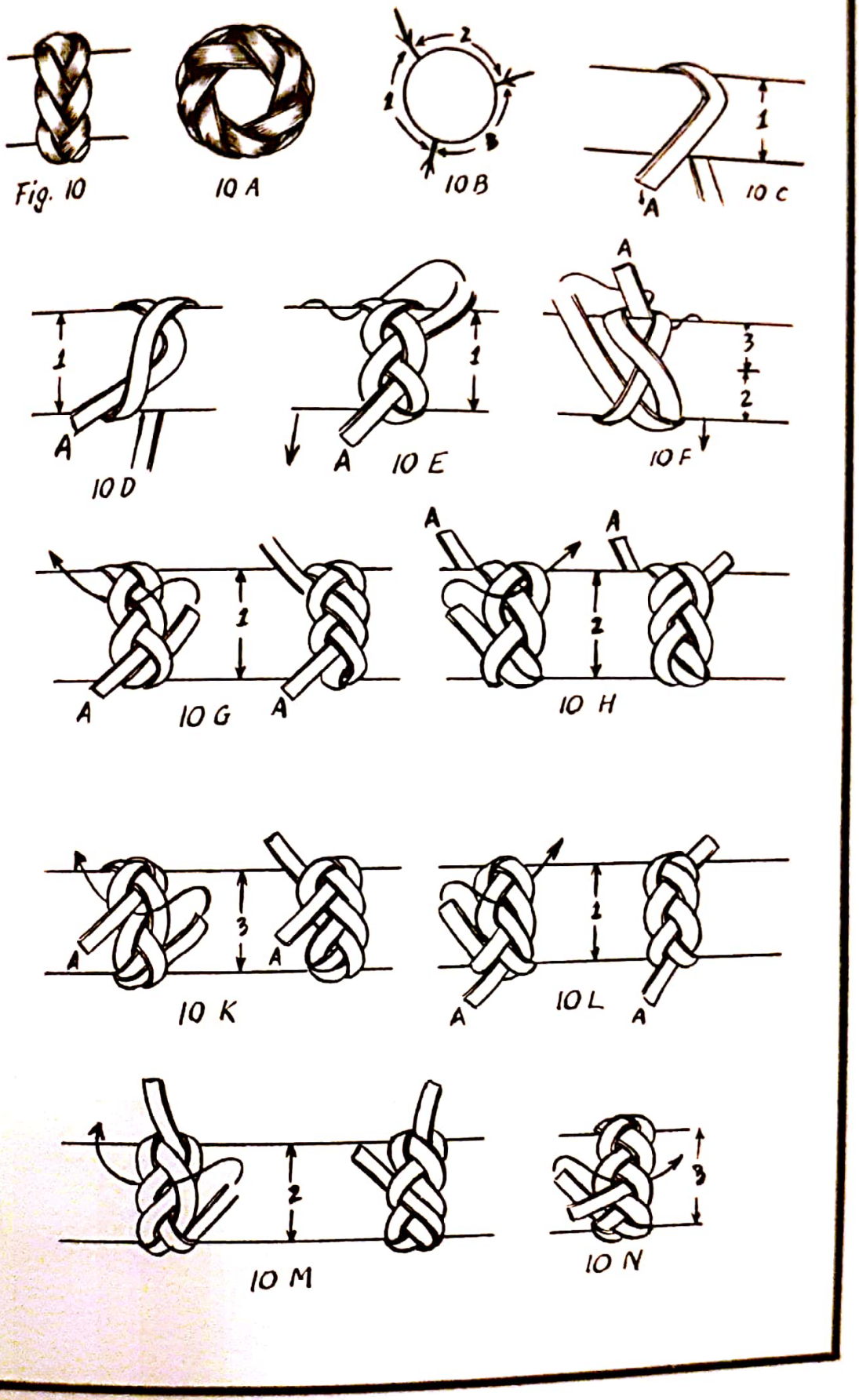

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LONG TWO BIGHT TURKS HEAD

Here is another simple knot which can be made any length by following the principle illustrated.

This knot is the easiest method of covering a long splice on a whip or tool handle, or a rope. An advantage in using this, rather than multi strand plaiting, is that there are only two ends to conceal when the knot is finished. Also, you will find that there is very little weaving to do in the first 3 passes, and consequently a long strand can be used without inconvenience.

Fig. (1) Start by winding the strand around the core until the desired length of plaiting is reached.

Fig. (2) Wind the strand back, crossing over the first turns and forming the same number of turns around the core. Bring the working end of the strand around and under the standing end of the strand, as shown in the drawing.

Fig. (3) The strand is wound forward again, parallel to the first turn, and passing OVER every strand.

Still in fig. (3), notice at the extreme right of this drawing that the strand, coming back to the left, passes under one.

The sequence from then is over one, under one, etc. until the strand is brought back to the extreme left of the knot.

Fig. (4) shows the appearance of the knot after this pass. The working end has met the standing end to form a complete 2 bight knot. The open spaces in the weave can be filled in by paralleling the original knot, and doubling or tripling.

INCREASING TO FOUR BIGHT KNOT

Another method, illustrated in figs. (4) to (7), is to increase the number of bights and parts in the knot, maintaining the over one, under one, sequence.

See in fig. (4) that the working end is moving to the right, parallel to and immediately below the standing end.

Fig. (5) shows the completion of this move. Note the parallel strands which have been illustrated closer together.

The working end is now brought to the left, and at the extreme right of fig. (5) it has crossed over the strand it was following, and is paralleling the same strand back to the left, still on the lower side of that strand.

Fig. (6) shows this move completed and the working end moving to the right, splitting a pair of parallel strands. Where it CROSSES OVER another pair of parallel strands, the two are treated as one, and the working end passes over both.

Fig. (7). When the working end has finished the move to the right, it is brought back to the left, again splitting pairs. On this pass, the sequence is over one, under one.

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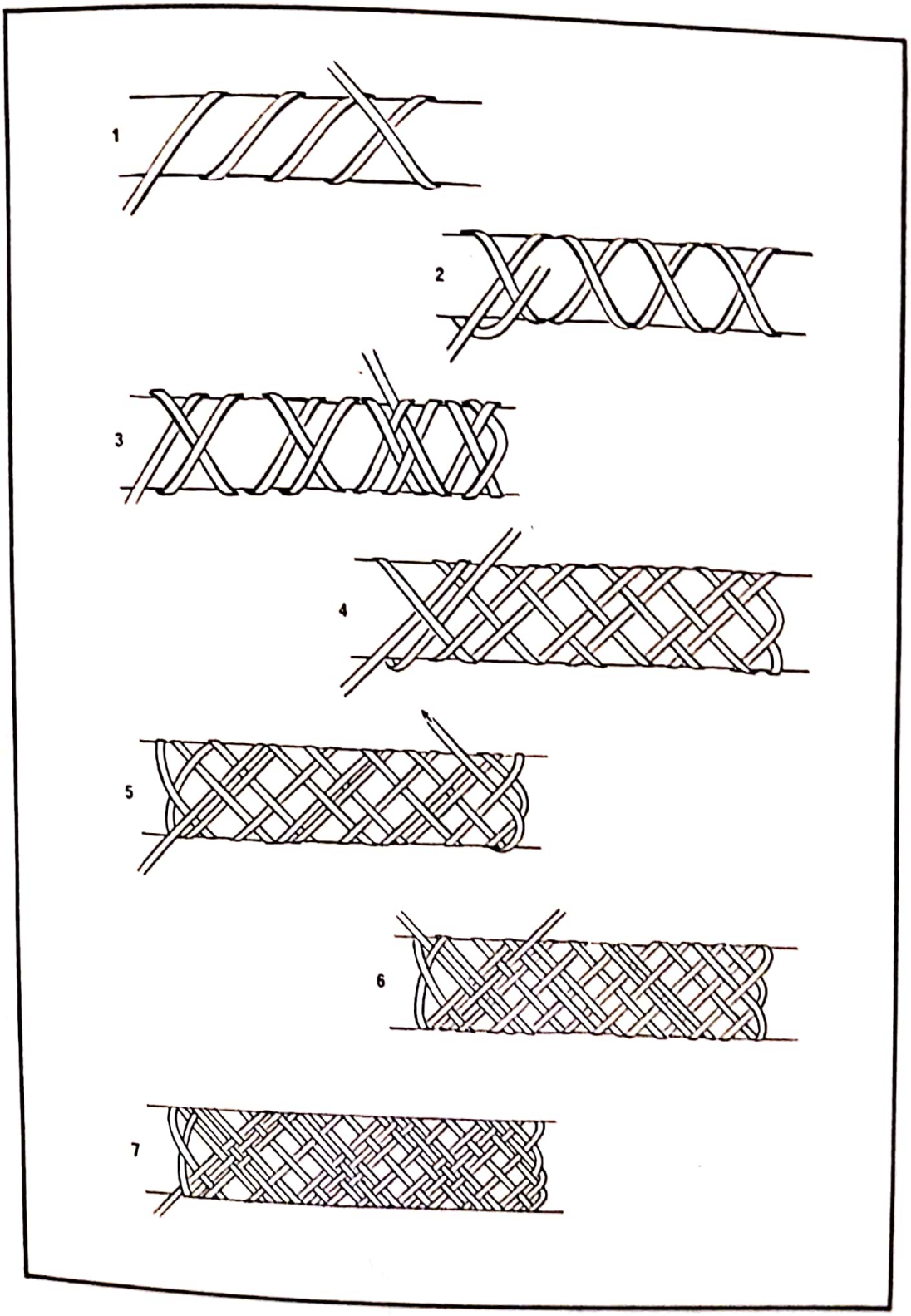
This plait can be made with any number of strands and any length in an over-two under-two sequence.



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BACK PLAITING

Fig. 1. Shows the strands cut on a keeper.

Fig. 2. Strands are laid around the core to be covered, and tied.

Fig. 3. This drawing shows, looking from the top, how the strands are placed over one and under one, each strand moving in the opposite direction around the core to the adjacent strand.

Fig. 4. Plaiting should now look like this, and is then plaited around the core, using the under one over one sequence as shown on Page 65

Fig. 5. When the desired length of plaiting has been reached the strands are plaited back as shown.

In this illustration the strands which were passing down to the left, are passed up to the left and the first pass takes them under one thong, then over one under one, etc.

Fig. 6. At the top of this sketch the 3 strands have been taken to the top, where they can be left temporarily.

Next, as shown at the bottom of the drawing, the 3 strands which were passing down to the right are taken up to the right, and each one passes over two under two over two, etc.

As it is not always convenient or desirable to cut on a keeper, the method for starting this plait with single strands is shown in Figs. 7 to 9.

Wind the thongs around the core as in Fig. 7, preferably twice around, and start with the topmost strand passing over one under one etc, as shown in figs. 8 and 9.

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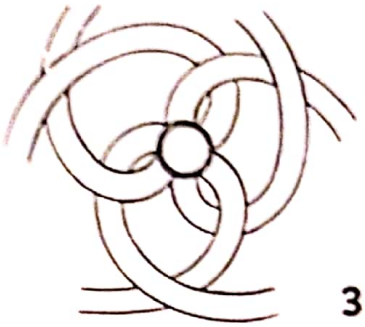

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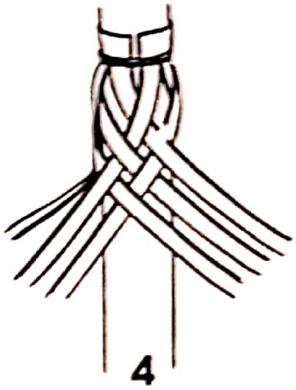

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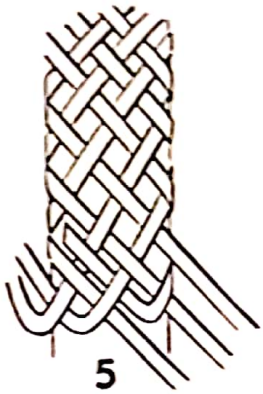

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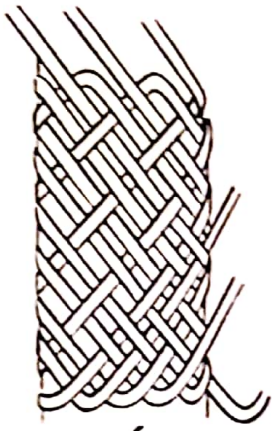

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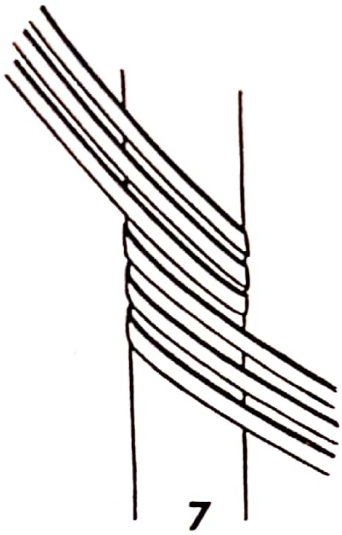

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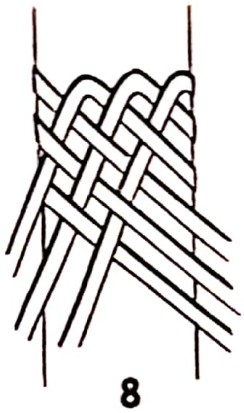

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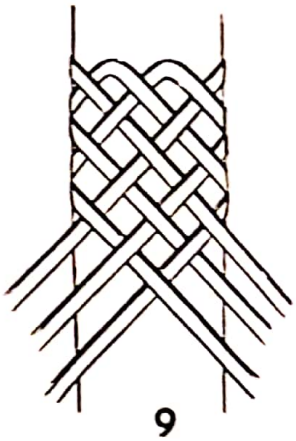

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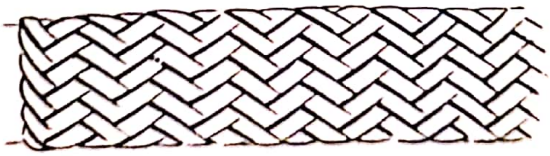

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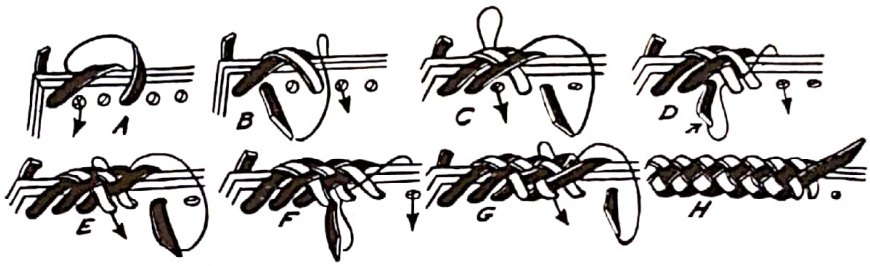
LACE EDGING

Four Plait Round Edge Lacing

This type of edge lacing, which resembles a strand of four plait round, is made with a single strand, The procedure is as follows:

1. Pass the strand through the first hole in the leather from back to front. See Sketch A.



2. Carry the strand over the edge and pass it through the fourth hole from back to front. See Sketch A.
3. Carry the strand over the edge and pass it through the second hole from back to front as indicated by the arrow in Sketch A. Sketch B also shows the strand through hole No. 2.
4. Carry the strand over the edge and pass it through hole No. 5 as indicated by the arrow in Sketch B. Sketch C shows the strand protruding from hole No. 5.
5. Carry the strand back to hole No. 3, passing it over the strand (extending from holes No. 2 to 5) and under the strand (extending from holes 1 to 4). See Sketch C. The strand is shown protruding from hole No. 3 in Sketch D.
6. Carry the strand under the strand (extending from holes 4 to 2) over the strand (extending from holes 5 to 3) over the edge and through hole No. 6 as indicated in Sketch D. The strand is shown protruding from hole No. 6 in Sketch E.
7. Again carry the strand over and under a strand as before. See Step 5 above and pass it through hole No. 4. This step is indicated by the arrow in Sketch E. The strand is shown protruding from hole No. 4 in Sketch F. The arrow in Sketch F indicates that the strand is to pass under and over a strand, over the edge and through hole No. 7. In Sketch G the strand is shown protruding from hole No. 7.

Repeat the process described in step No. 5 carrying the strand over one and under one and back through hole No. 5.

The appearance of a section of edge laced as described in Steps 1 to 7 is shown in Sketch H.

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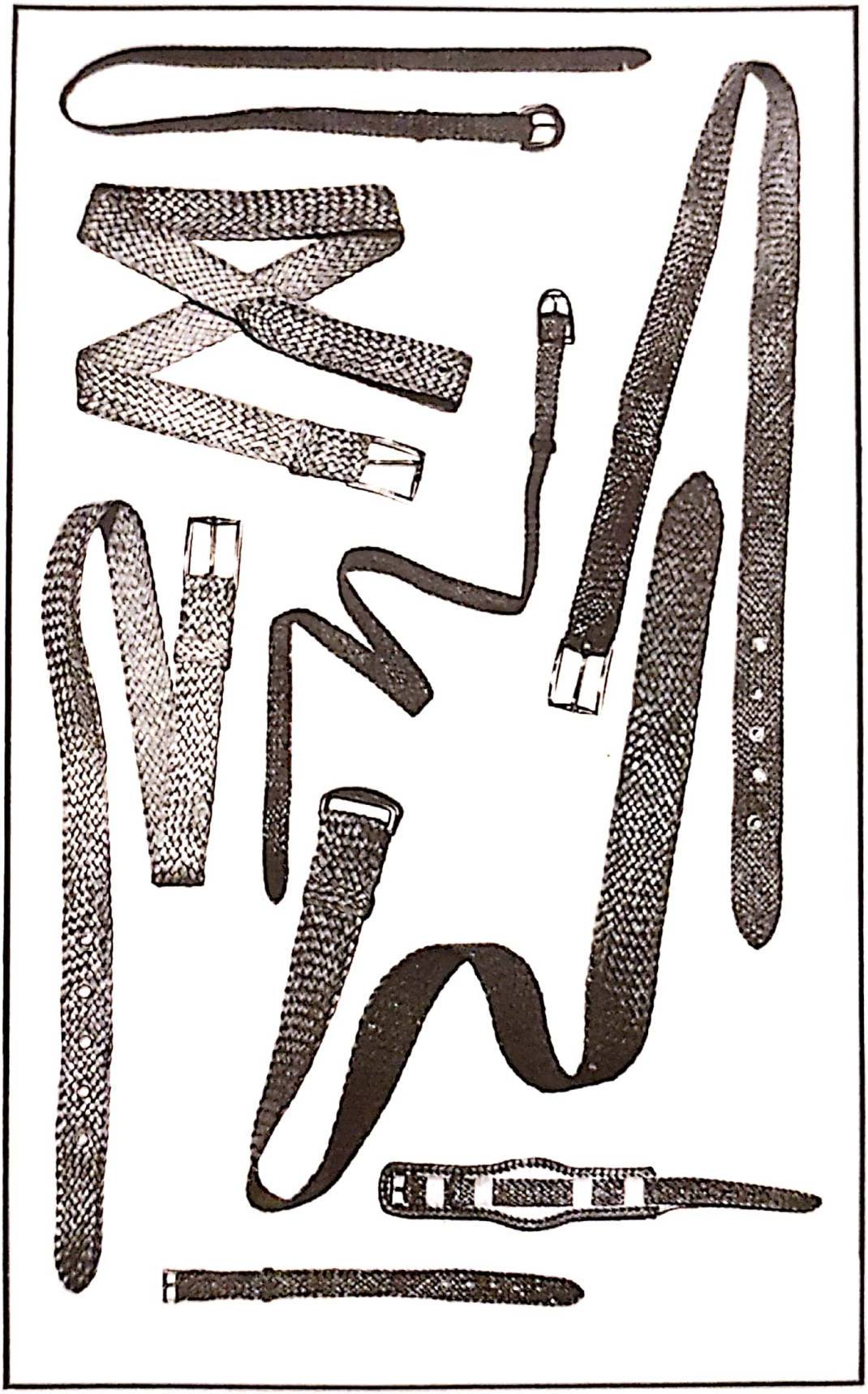

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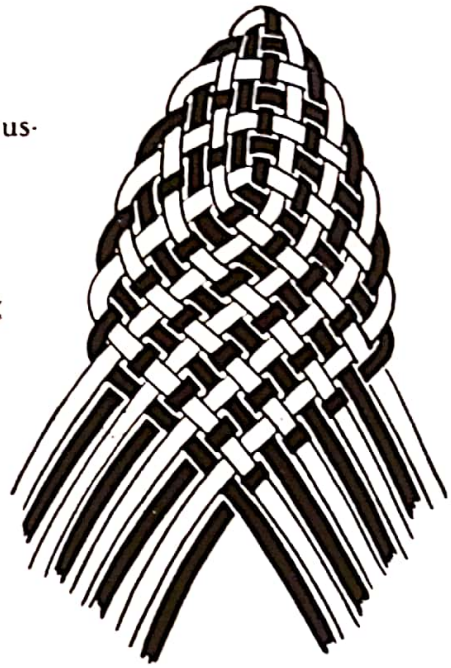
START OF ALL FLAT PLAITING

This diagram illustrates nicely the start of all flat plaits, and can be used with varying numbers.



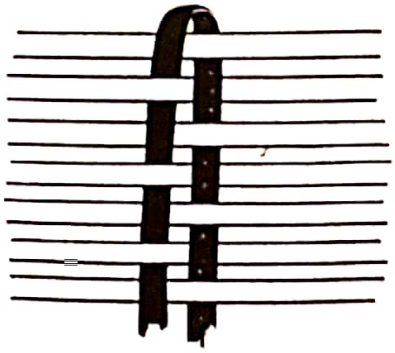
A

BELTS

Start as above flat plaiting of, say, a 16-plait belt, by laying one strand crosswise and folding over the centre of it another strand.

Then cross another strand thus:

Continue placing the strand over and under thus until the required number of strands are in position.



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The block No. A illustrates how these strands are then crossed over, starting at the outside, until each one has been interwoven to the opposite side.

Flat bands start the same, also wrist straps and all flat plaits.

To work in a diamond pattern, dye one strand and use it as the first cross strand. This will make a diamond pattern as it crosses from side to side.

Strands for all flat plaiting need to be cut three times the length of the article to be plaited. This strand is then doubled and the extra length, viz., one-third, is taken up in the plaiting.

PLAITING BACK AT BUCKLE END

This plaiting back of the end of the job is a puzzle to all beginners, and although it looks simple, and is not difficult, yet a word of advice is needed.

Plait the belt four inches longer than is needed to go round the body to allow for overlap and ½ inch for going over the tongue of the buckle. ½ in. is enough to go past the tongue, then start with the centre strands and work outward each way, following the corresponding strands of the belt.

Start with the centre strands and work out, as it is not easy to work inwards.

Allow 3 to 4 inches extra length on each strand for the plaiting back.

An awl blade or large needle will be found most useful when finishing this job

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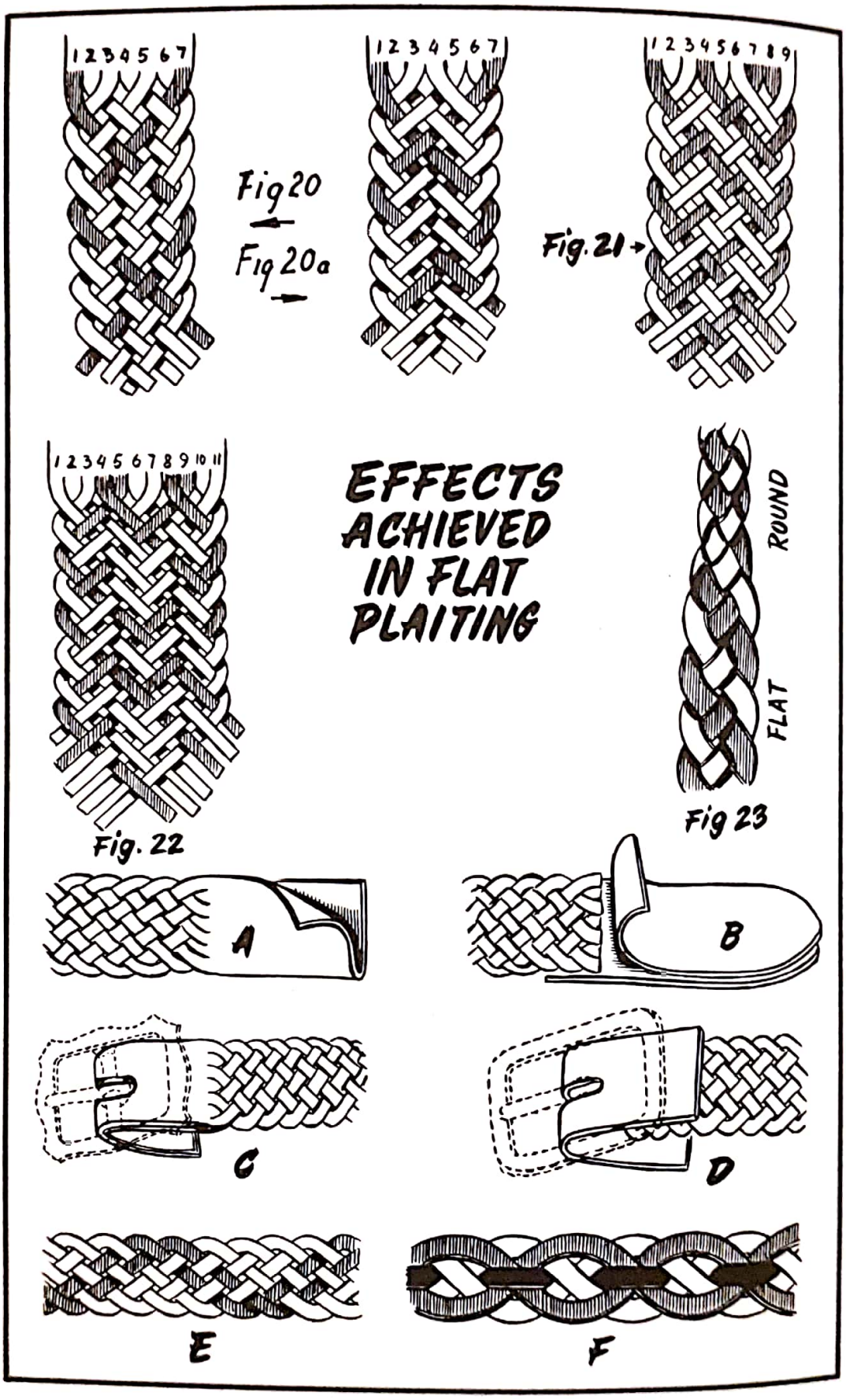

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The illustrations, Figs. 20 to 23, show the appearance of flat plaited strands made from seven, nine, eleven and thirteen strands.

Figures 20 and 20A show two design patterns which are made with seven strands, one a simple over one and under one weave, the other a herringbone pattern produced by carrying the strands over two and under two.

In Fig. 21, nine strands are woven into the design shown by carrying each strand under two over one and under one and over two.

In Fig. 22, eleven strands are woven into the design shown by carrying each strand under two, over two, under two and over two.

The construction of the four plait flat is shown in Sketch 23, continuing a four plait round to form a flat section for a ring or dee attachment.

Sketches A to F on the previous page show belts made from wide strips that have been split into the desired number of strands and started by folding the wide end over itself as shown in Sketch B, and the end stitched or cemented down.

The ending of the plaited strand and a method of attaching the tongue is shown in Sketch C. Two pieces of the same leather are cemented together flesh sides inward. The ends of the plaited strand are held firmly between end pieces. See Sketch C.

The end may be machine or hand stitched across instead of cemented, if desired.

Strands of different colours may be used and the ends secured at the buckle end by the method shown in Sketch C.

The lengths and width of flat plaited strands is approximately two-thirds of the length and width of the strands from which it is made

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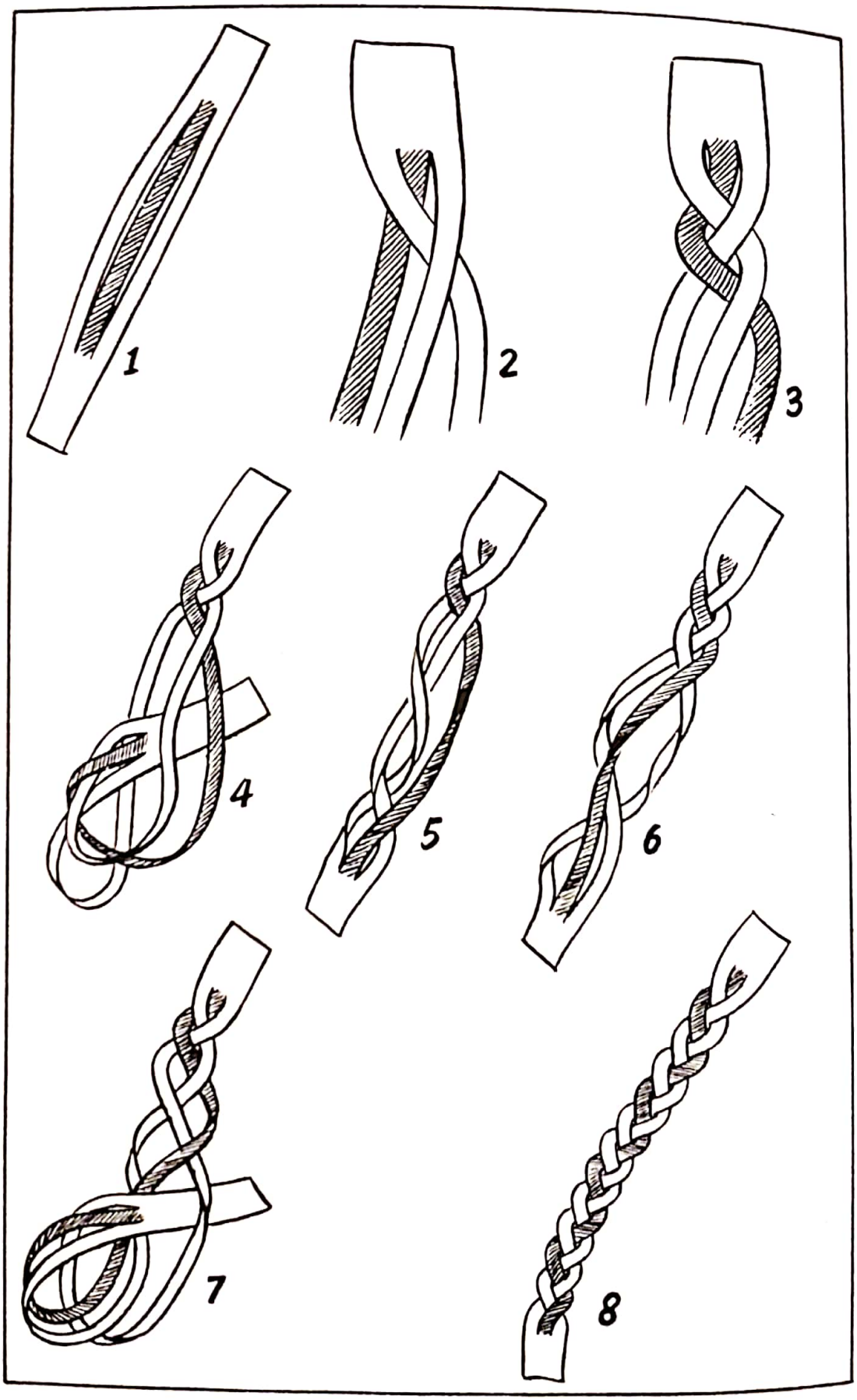

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THREE PLAIT UNCUT BELT

Cut a plain belt about 42 inches long for the average man. Sew on a buckle in the usual way, and then proceed to split into 3 even strands, leaving the belt uncut at both ends as shown in Figure I.

Commence plaiting 1 over 2, then 3 over 1 (see 2)*, then 2 over 3, then 1 over 2, as in (3) *.

While this is happening a tangle is forming in the lower section of the leather, which is taken out by passing the lower end of the leather through the loop as shown in (4)*. The appearance of the belt is now as in figure 5.

Continue the plait, 3 over 1, 2 over 3, when the leather will lay as in (6) * with the rough side out.

Remove this tangle by passing the lower end through as shown in 7.

An easy way to remember the procedure, is to count every time one strand is laid over another as one pass.

Then our method is 4 passes, then put the end through (as in 4), 2 passes, end through (as in 7). Repeat this sequence until the plaiting cannot be taken any further, and you will find there is an empty space of about 2 inches at the bottom. Fill this in by opening up the plait evenly throughout the length of the belt.

Many types of belts, straps, bridle reins, handles for bags and wrist watch straps can be made by this method. The plaiting reduces the length of the cut section by approximately 25 per cent.

FIVE PLAIT UNCUT BELT

The five plait is prepared in a similar manner, and the sequence is five passes, pass the end through, five more passes and pass the end through.

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This knot is used extensively in the Kimberleys for attaching the bridle reins to the bit ring, and has the double advantage of obviating the necessity for buckles, as well as presenting a double thickness of leather to the bit ring, thus greatly minimizing wear at that point.

Fig. 1

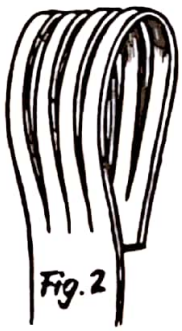
Fig. 2

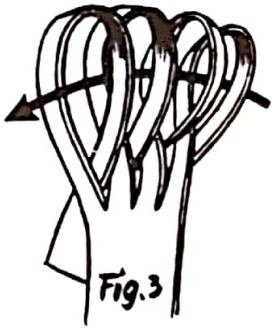
Fig. 3

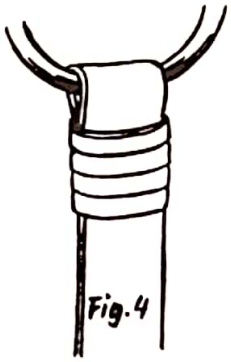
Fig. 4

Fig. 5

To make the knot: With a sharp knife, cut three slits $3\frac{1}{2}$ inches to 4 inches long (depending on the width of leather) in the end of the rein, starting about $1\frac{1}{4}$ inches from the end (figure 1). Double this section over as shown in figure 2, thus forming four loops of equal size. Each of these loops is now half-hitched behind the one next to it (figure 3). Start with loop D, taking it back behind loop C; then take loop C behind loop B, which, in turn, is taken behind loop A. The other end of the rein is now passed through the bit ring, and then threaded through the four loops, as shown by the arrow line in figure 3. Pull the rein right through the loops, and tighten the knot. The outside appearance of the completed knot is shown in figure 4, while the inside appearance is shown in figure 5. This knot can also be made with three loops, instead of four.

The other ends of the reins are usually left open, but can be tied with the attractive knot, the Two Thong Turkshead.

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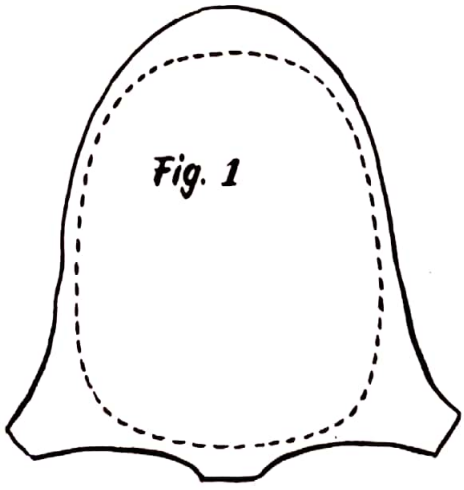
How to make a WHIP

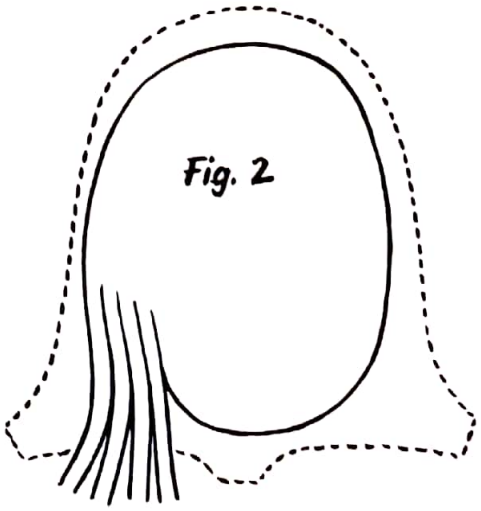
The following instructions are for making an eight foot, twelve plait stockwhip. Other types of whips can be made using the same methods; lengths, and numbers of strands are then varied accordingly.

CUTTING THE BELLY

A medium weight kangaroo skin is required, which should be from 3/4 to 1 lb. in weight when tanned, not too coarse, and reasonably free from holes and blemishes.

Trim the skin as shown in fig. 1, leaving a small portion of flank.





Four strands, 3/8 wide are required for the belly of the whip, and these are cut as shown in fig. 2, starting at the widest flanky section. Cut these 3/8 strands to a length of five feet, then widen them gradually to $\frac{1}{2}$", and taper back to 3/8 again. The overall length at this point should be about 6 feet. Continue the last cut a further 6 feet, tapering to a point as in fig. 3. This solid piece will form a loop or keeper, and the tapered section is plaited over, into the centre of the whip.

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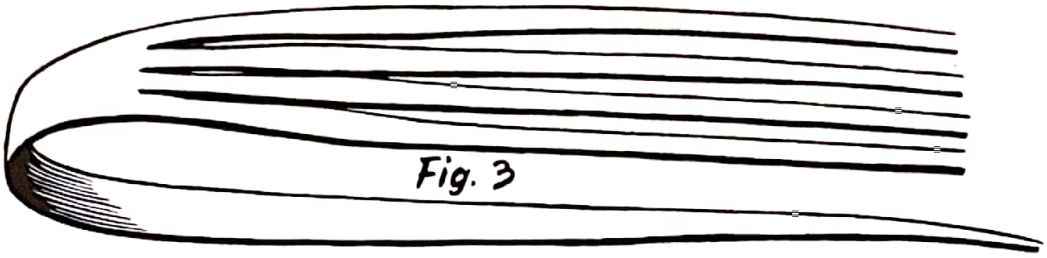

Fig. 3

The shape of a whip is determined by the foundation of the belly, which is made of a strip of kangaroo hide or kip. (See fig. 4).

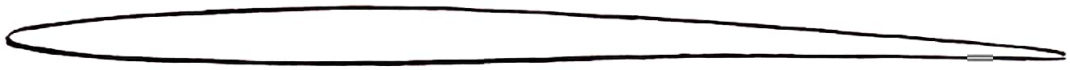

Fig. 4

This piece will be rounded into the centre of the whip, so the edges should be skived to ensure a neater, flatter joint.

PLAITING THE BELLY

The piece of roo that was cut into 4 strands, is doubled over as in fig. 3, leaving a loop of solid leather about $1\frac{1}{2}$" long. Insert the shaped foundation, and plait round as illustrated earlier in this book. If the whip is to be weighted, shot can be sewn into a piece of calico, or rolled in a light piece of flanky kangaroo, and plaited into the belly of the whip at its thickest part, approximately 9" from the keeper.

CUTTING THE WHIP

If there is enough of the first kangaroo hide left, the twelve strands for the outside covering can be cut from this. Otherwise another hide must be prepared in the same manner. Cut 4 strands about 12" long, and then start another 4, making 8 in all as in fig. 5.

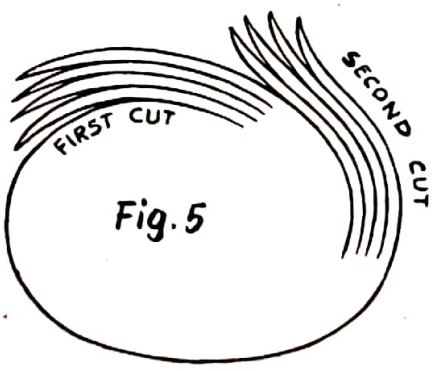

Fig. 5

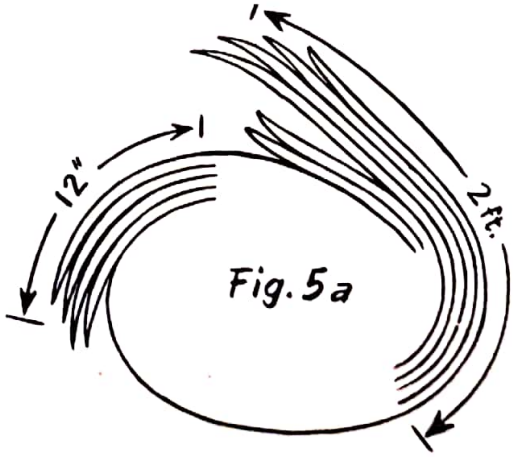

Fig. 5a

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Continue the second 4 strands for another 2 feet, and then start another 2 strands in the centre of the two groups. (fig 5A) Repeat this procedure, starting another 2 strands in the middle of the ten strands already cut. Now the 12 strands can be cut around the hide, until the desired length is obtained. For an 8 foot whip, 12 feet of stranding are needed.

The reason for cutting the strands in stages, is to get all twelve the same length. If the twelve strands are stranded together, some will be longer, and will have to be trimmed, thus wasting good hide. Extend the last cut as in fig. 3, to form another keeper.

Another piece of shaping leather is cut, similar to the foundation piece (fig. 4) using redhide or kip, skiving the edges as in fig. 6.

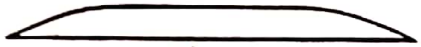

Fig. 6

PLAITING THE WHIP

Good plaiting will only result from careful preparation, and even tension, and whip plaiting in particular should always be done in a standing position.

Using a hook in a post or tree, hang the plaited belly over this, by its keeper.

Lay the 12 strand piece over the belly, forming another keeper, insert the shaping piece, and start plaiting over the belly, shaping piece, and the loose end of the 12 strand piece.

The first few inches should be plaited with an over one under one sequence either using single strands, or grouping the strands in pairs. This plait will pull in very tight, and ensure that the loose end of the keeper will not pull out.

The rest of the whip can be plaited with an under two over two, or under four over four sequence.

As the whip gets thinner, towards the tail, the strands will start to creep, or overlap. This is the time to drop two strands and continue with 10. The 2 strands that are left out, can be plaited over for a few inches, and then trimmed off, if desired. Each time the strands start to overlap, continue to drop two, until there are only 6 strands left. Finish the whip with 6 strands.

If the belly and strands have been cut correctly in an 8 foot whip, the first 2 strands should be dropped about 4'6" down from the keeper and six strands should be left approximately 1 foot from the tail of the whip.

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TAILING

Cut a tail about 18 inches to 2 feet long using kangaroo hide or kip and shape from 3/8" to 1/8". Round this tail by rolling a strand twice around the tail and drawing backwards and forwards.

Cut a slit $\frac{1}{2}$" long in the heavy end of the tail and pass the 6 strands of the unfinished whip through the hole. See fig. 7.

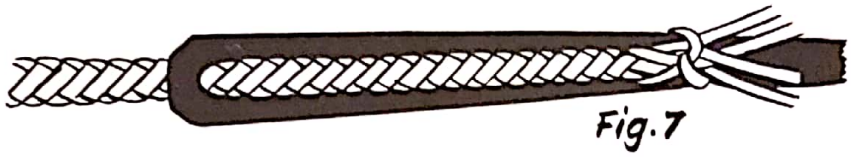

Fig. 7

Now wrap each strand around the tail in order as shown in fig. 8.

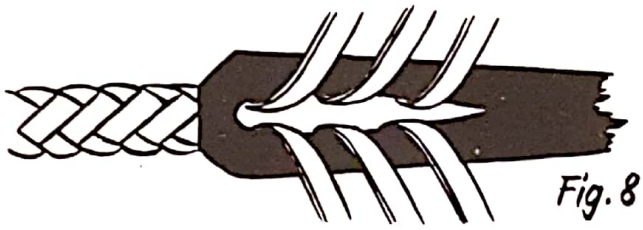

Fig. 8

Pass the 1st strand over the top, under the tail and through its own loop towards the tail.

The 2nd strand passes over the tail and the first strand through the loop thus made and lies alongside the 1st strand towards the tail.

The 3rd strand around the tail and the other two strands, through the loop, and alongside the other 2 strands.

Follow the same procedure with strands 4 and 5.

The 6th strand goes over the tail and over the other 5 strands, locking them all in place. Fig. 9.

Fig. 9

Pull all strands tight, cut off the loose ends, and roll under the foot. Give the whip a coat of saddle dressing.

When putting on the tail a point to be noted is that a tighter job can be had by plaiting the six strands of the whip around the small end of the tail and then pulling the tail through to the butt end.

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CRACKER

Finish off the whip with a cracker made of six-cord crochet cotton or any similar cotton or silk will do. This can be turned up by twisting a dozen strands with a pencil and doubling the twisted strand. After doubling put an ordinary half hitch around one half to secure your cracker.

A cracker is essential for a sharp cracking whip and also saves the leather tail, although it is not absolutely necessary for practical purposes. To fix see fig. 10.

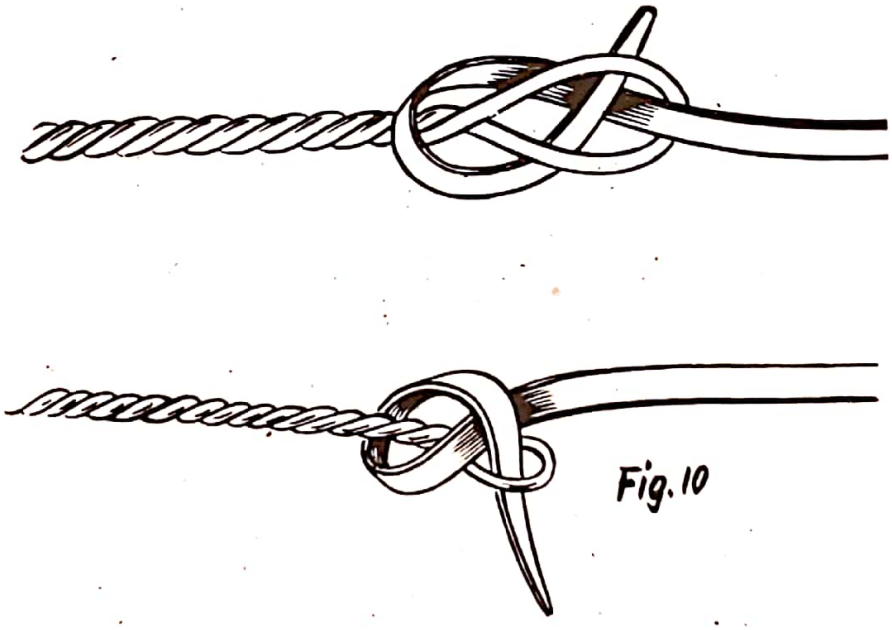

Fig. 10

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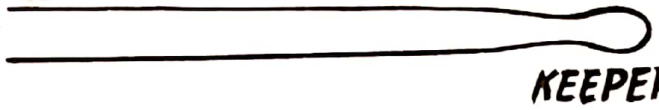
HOW TO MAKE A WHIP HANDLE

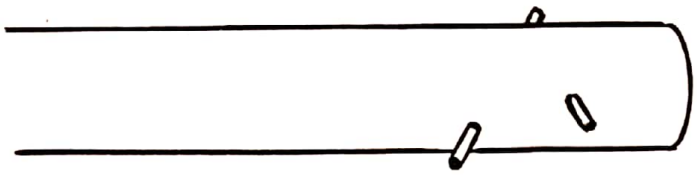
Cane is the best material for a handle but hickory or spotted gum and some other woods like "dead finish" will do. Snappy woods like mulga are too brittle. Best average length is 19 inches.

Rasp a knob onto the keeper end so that the keeper will not pull off.

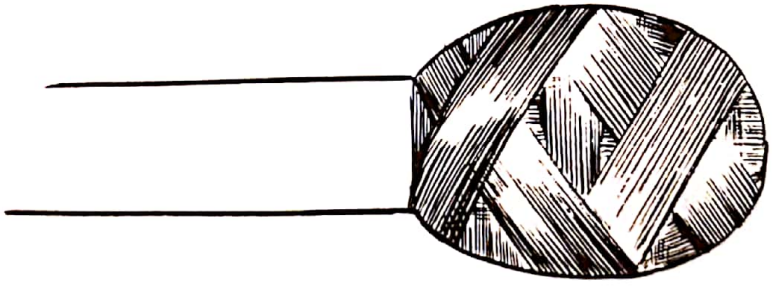


KEEPER END

The ball on the handle end is made as follows: Bore four fine holes starting half an inch from the end .... making one each three eighths along the handle until four have been bored. Into these small holes put a light nail and cut the nail 1/8 of an inch from the wood.



The nails should exactly fit the holes and project each side. Wind light hemp or cotton or string around these pegs in such a manner that they finish up this shape.



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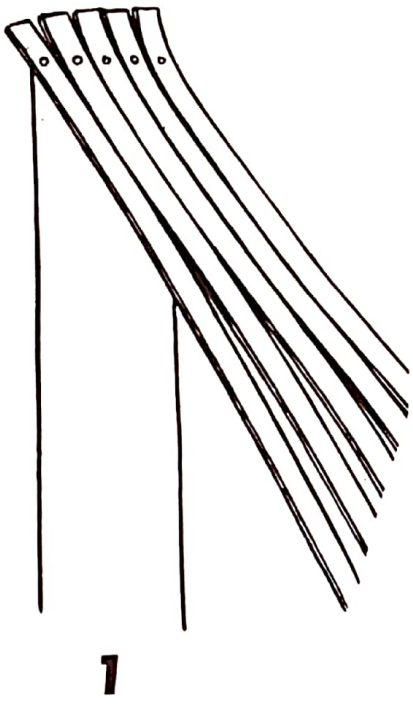
Over this shape plait the knot illustrated on page 82 plaiting section.

The keeper is put on with either hemp or twisted kangaroo hide. . . some good plaiters will even plait tight enough to make a hard tight fix. I suggest that the kangaroo hide twisted is the easiest and looks good. The first six inches of the handle can be plaited Sennett (over one under one).



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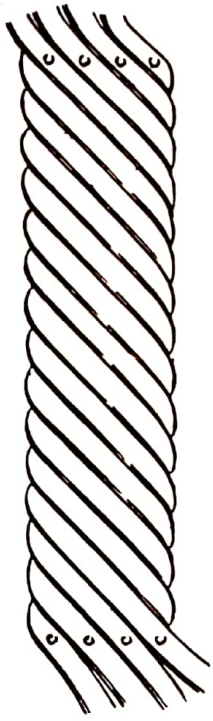
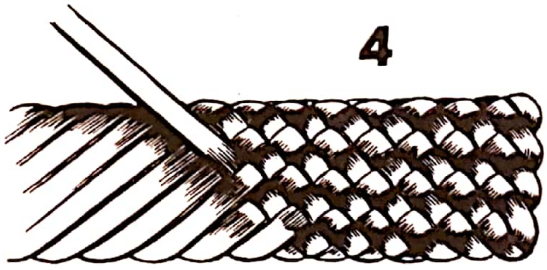


2

3

Use about the right number of strands to cover a handle right around and put a tack at the top of each strand. Wind the strand around until every part of the handle to be plaited is completely covered, tack at the bottom then turn back and plait each strand over and under.



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The keeper should be $1\frac{3}{4}$ inches past the end of the handle.. as thick and as good as you can get in Kangaroo hide about 5/8 inch wide.

You cannot taper cane but the best thicknesses for hickory are a little less than half an inch at the keeper end and $\frac{3}{4}$ inch at the handle end.

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BUSH KNOT FOR WHIP HANDLE TOP

This is the best knot for whip handle tops. The knot is a simple Turk worked over three or four times, depending on the size required.

The drawing opposite speaks for itself, but just in case you get stuck I will describe the method simply in the same words that my old father left written down for me to follow. It is a knot that I had forgotten, although it was used by all good whip handle makers half a century ago.

This is all I could find of the description and from it I worked it out, so perhaps you can do the same.

Up to the top and back over number one, up to the top again and over number one, down on the far side and under number one on the top side, over a strand and up to top going under a strand as you go to top, over two strands, under a strand going down, now over two at the bottom and under one strand going up, over one, under one, over one, under one and the knot is complete . . . follow the first strand three or four times around.

Make sure that the centre core is tight and hard, by winding with hemp and dipping in glue and leaving it to dry for a few days.

When the knot is finished, varnish with leather varnish - it looks better and stays harder. This knot will not come off.

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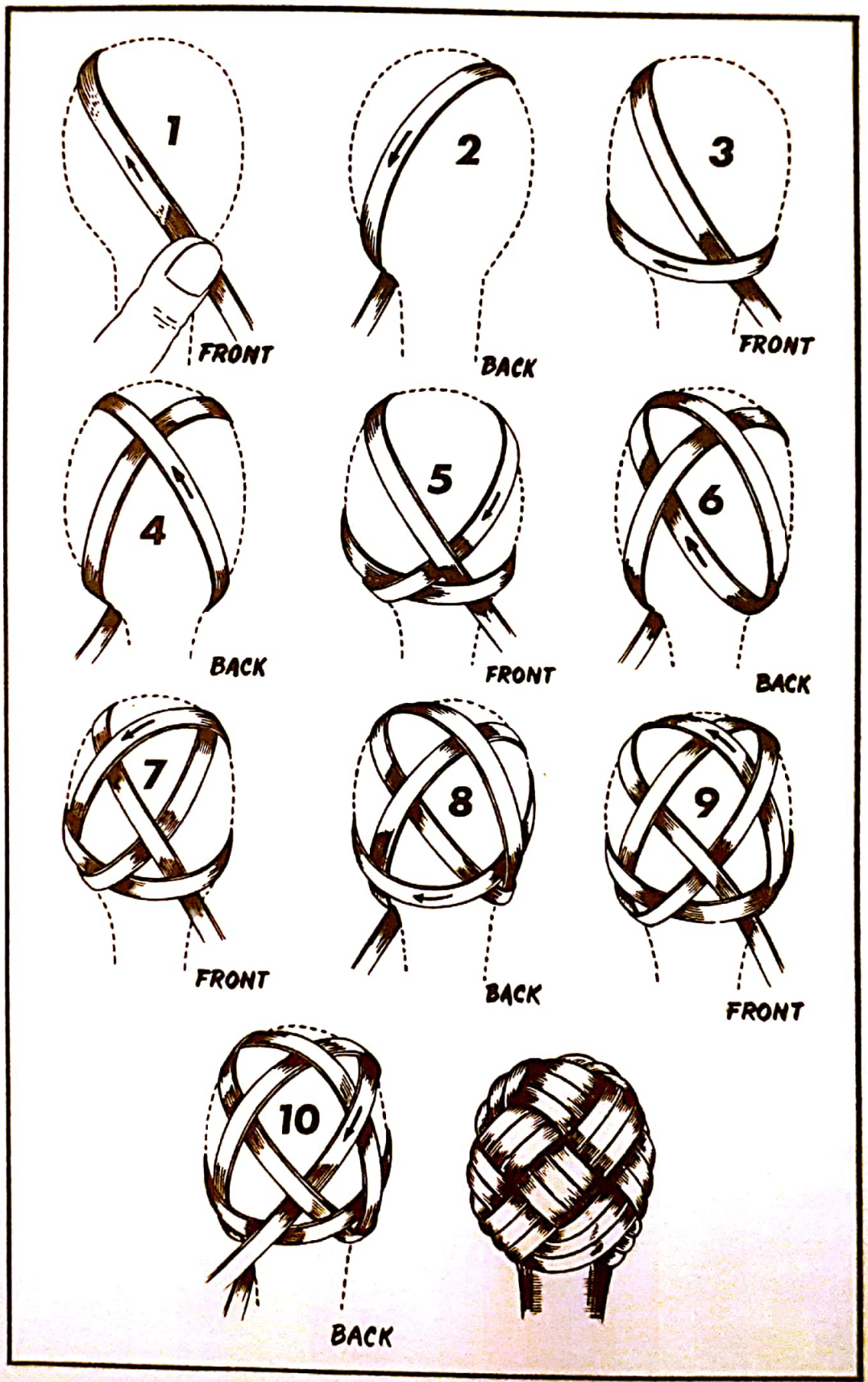

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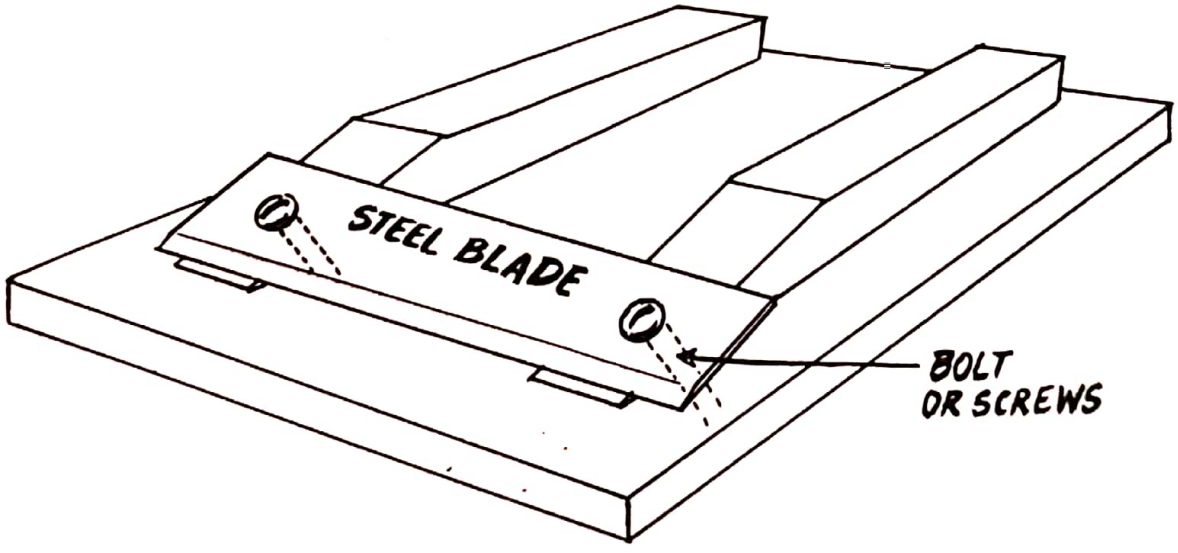
Rawhide

PREPARATION OF HIDES

Cutting strands for any rawhide work will demand a very fine degree of judgment in curing the hide - not too wet and not too dry. Tempering is the word. If you are working with hide that has been dried right out it will need to be cured back or tempered by rolling it in a wet bag overnight; or if you have hide straight off the back of the beast then roll it up in paper to cure. If you are in a hurry peg it out for two hours, taking care that the thin parts do not dry too much.

A method which is quite practical for most purposes for which you will need rawhide is to cut it roughly into strips about $2\frac{1}{2}$ inches wide with a butcher's knife soon after you have pegged it out and while it is still wet - these strips are easier to handle, and if taken round and around the hide can be cut to any length and will suffice for a whip.

Another important point in preparing the rawhide is to thickness it after it is stranded. The best method is to get an old saddler's splitter and spend a lot of time getting it razor-



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sharp pulling the strands through after it is tempered, not too wet and dry enough to be firm. You can make such a splitter by sharpening a piece of good steel and fixing it in a sloping or tapered cut in a piece of wood.

There are many ways of using rawhide off the beast's back, but some people have a strong preference for hides which are salt cured by the covering of a bleeding hide with a thick layer of coarse salt. This salt takes out the blood and glue which leaks away. Such hides are best salted on a sloping board to drain. When using wash out the salt and temper the hide the same as other methods.

If you are a perfectionist and require your hide to be supple and durable without being affected by the wet, make a smoke box and smoke the hide well before curing.

Another method of keeping hide soft is by putting an animal's brains into a bowl and mixing into a paste, then, after rubbing it well into the hide, smoking for several hours keeping the heat away from the hide.

PREPARING RAWHIDE FOR USE

Rawhide is used for purposes demanding great strength, since it is much stronger than tanned leather. Tough hides of any size are easily turned into rawhide. Kangaroos and calves make soft, thin lacings for shoes and various leathercraft articles. Hides of wombat, cows and horses supply rawhide for heavier thongs, belt lacings, bearings, sockets and material for wear-resisting purposes.

The simplest way to handle a fresh hide is to treat it in the following manner: Use no salt. Remove hair and grain, and flesh well as directed in Tanning. While the hide is wet and soft, stretch it in a stout frame made heavy enough to stand a great strain (Fig. 1).

With an awl punch holes every two inches around edge of hide and lace it in the frame with fishline or leather thongs. After hide is laced in place, twist every pair of cords with a short stick to exert still greater pressure. The tighter you stretch the skin the better rawhide you make, using discretion with smaller skins, of course.

Let hide dry in the frame, which must be set out of the direct rays of sun and away from artificial heat. When perfectly dry, paint the flesh side with a mixture of equal parts beef tallow and neatsfoot oil. Apply with an ordinary paint brush and give a heavy coat. Mix the tallow with oil over a low heat and apply warm.

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In cold weather, warm the hide slightly before applying, or at least work in a warm room. Then remove from frame and break skin over the edges of a board (see page 26).

If the skin refuses to soften as much as you desire, give another coat of tallow and neatsfoot oil and break over board a second time.

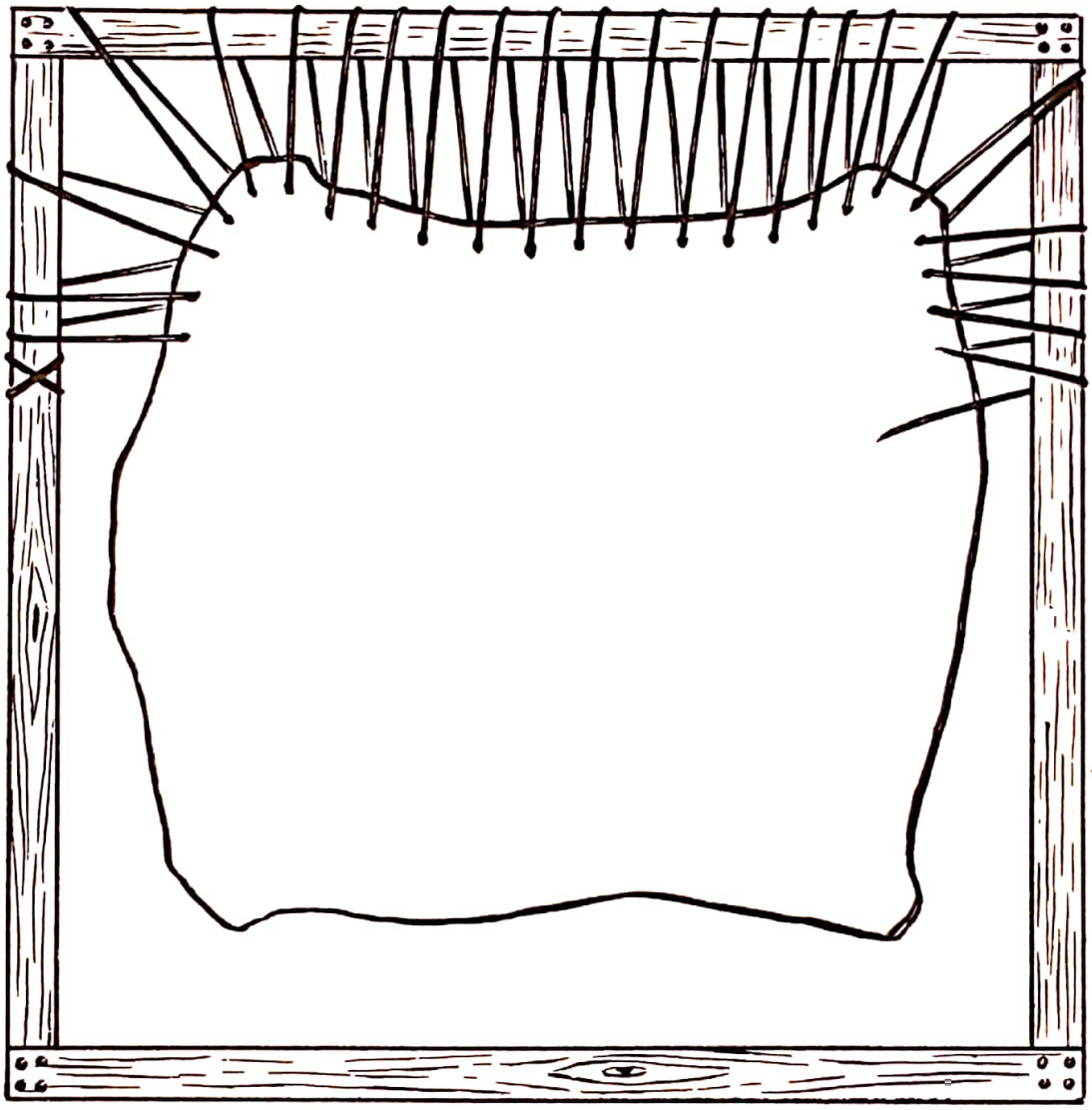

Fig. 1 - Stretching Frame.

The diagram shows hide being laced inside frame to be made into rawhide. For calfskins and pieces of large hides use 2 by 4 foot frame. A 6 by 6 foot frame is necessary for full-sized cowhides.

Wood frame must be strong and rigid with corners securely fastened.

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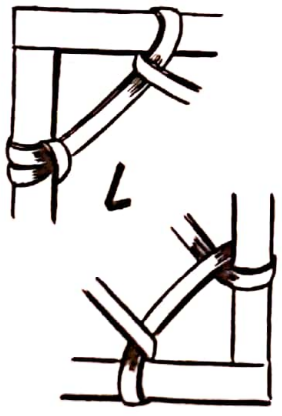
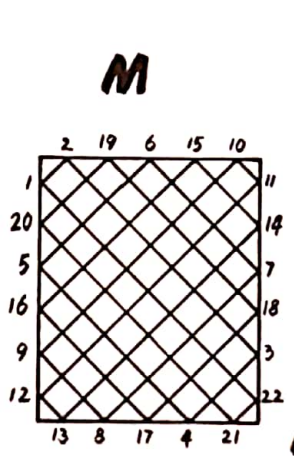
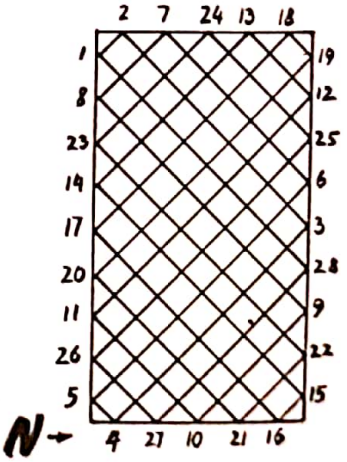
A METHOD OF LACING A BED WITH RAWHIDE STRAND

The frame to be laced may be the top of a bench, chair bottom or back, couch, bunk or bedstead. Tie the free end of the rawhide strand, the one that emerges from the end of the coil to one side of the frame at a point about 2 inches south of the north-west corner of the frame, see position of starting point No. 1 of Fig. M. Carry the strand diagonally across the corner of the frame to point No. 2, which is located about 2 inches east of the north-west corner. Encircle the frame and bring the coil of rawhide up through the mesh formed by the strand between points 1 and 2 and the sides of the frame.

Hitch around the frame at No. 3, and proceed to point No. 4, located about 4 inches west of the south-east corner. At each point numbered from 1 to 22 in the lacing diagram, carry the strand over itself and proceed to the next numbered point in rotation. Continue lacing the frame from point to point, weaving the strand over or under each lacing according to the following table for lacing frame M.







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The space or size of mesh between laced strands need not be smaller than about $2\frac{1}{2}$ inches, and for this spacing, each square foot of frame area will require approximately 20 feet of rawhide strand.

Principle: Carry the strand over the frame then over itself.

FRAME M			FRAME N			FRAME N		
Lace From Points	Over Strands	Under Strands	Lace From Points	Over Points	Under Strands	Lace From Points	Over Strands	Under Strands
5.6	-	2.3	5.6	2.3	-	-	3.4	-
7.8	2.3	4.5	7.8	-	2.3	-	9.10	-
9.10	4.5	2.3	8.9	-	5.6	21.22	-	16.17
-	-	6.7	-	3.4	-	-	14.15	-
11.12	6.7	-	10.11	-	3.4	22.23	-	9.10
-	2.3	4.5	-	5.6	-	-	-	3.4
-	-	8.9	11.12	8.9	-	-	5.6	-
13.14	8.9	-	-	2.3	6.7	-	11.12	19.20
-	4.5	2.3	13.14	6.7	2.3	-	17.18	13.14
-	-	6.7	-	-	8.9	23.24	8.9	-
14.15	11.12	9.10	14.15	-	11.12	-	2.3	6.7
15.16	6.7	-	-	5.6	3.4	24.25	13.14	17.18
-	2.3	4.5	16.17	-	9.10	-	19.20	11.12
16.17	9.10	11.12	-	-	3.4	25.26	6.7	2.3
-	13.14	7.8	-	5.6	-	-	-	8.9
17.18	4.5	2.3	-	11.12	-	-	22.23	14.15
18.19	7.8	13.14	17.18	14.15	-	-	16.17	20.21
-	11.12	9.10	-	8.9	-	-	10.11	-
-	15.16	5.6	-	2.3	-	26.27	-	5.6
19.20	2.3	-	-	-	6.7	-	3.4	-
20.21	5.6	15.16	-	-	12.13	27.28	-	10.11
-	9.10	11.12	19.20	12.13	-	-	20.21	16.17
-	13.14	7.8	-	6.7	2.3	-	14.15	22.23
-	17.18	3.4	-	-	8.9	-	8.9	-
22.1	3.4	17.18	-	-	14.15	28.1	-	3.4
-	7.8	13.14	-	16.17	-	-	5.6	25.26
-	11.12	9.10	20.21	-	11.12	-	11.12	19.20
-	15.16	5.6	-	-	5.6	-	17.18	13.14
-	19.20	-	-	-	-	-	3.4	7.8

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RAWHIDE ROPE

The making of rawhide ropes seems to be almost a lost art, in spite of the fact that so many cattlemen still use bronco ropes and leg ropes. Cotton or sisal ropes, waxed or otherwise, are a poor substitute, besides being expensive.

The following article, step by step, is the result of many years of making hide ropes. The author also has some claim to being able to use and to know the use of a bronco or catching rope.

The rope described will be the standard bronco rope of working weight. The reader can adjust to make any other type he may want. Like most other things in the making, it is the detail that counts, so it will be the details that will take most of the space.

SELECTION OF A HIDE

Now, the making of a good rope starts with the selection of a suitable hide, because you cannot make a good rope out of a bad hide. Select a young beast about two years or under three, preferably one that has not grown up in drought, because it will have a papery hide or have bad growth spots in it. Some folk say a roan beast or a white hide, but I do not think it makes much difference, so long as the beast is healthy and well developed. A heifer's hide, I think, is better than a steer's and a bull is definitely not good.

When killed, make sure that you skin the beast yourself, and watch those ribs, so that you don't cut the hide. Skin clean, without taking off a rib roast with the hide, as the hide has to be properly fleshed afterwards and it is a lot of work if there is too much meat on the hide. Besides, the hide will dry in patches, and under the slabs of flesh will be soft and wet.

Peg the hide well, pull it tight and make sure that it is in the shade. This is important, as the condition of the hide when you come to cut it and twist it is everything. When the hide has set and before it goes brown in patches, get a sharp axe and flesh the hide perfectly. Do not leave any fat on the edges, nor flesh on the ribs. Do this about forty-eight hours after killing if working anywhere in the warm inland. On the coast you could perhaps leave it a little longer. Wait until the hide is firm but not in any way hard or bone dry, neither must it be soft or floppy, just set and firm to the feel but still wet.

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Drive a nail into the centre of the hide. Now this might sound a bit fussy, but the nail needs to be the gauge of a five or six inch nail. The reason is that it is the correct diameter to cut the correct width strand when used as a pivot.

Wind a length of carpenters' or bricklayers' line around the nail as evenly as possible, starting at the bottom and winding up without lapping the coils over each other. Each turn represents a full circle of the hide, so it should not be an inch round once and an inch and a quarter the next time. You will use this cord as a gauge to make the circles, starting at the centre or about six inches out, and mark with a black pencil or, better still, puce pencil, as you go. You will find that the nail will give you the correct gauge for a three strand bronco rope of working weight, from a young beast's hide.

Remember that as you go around the hide you are making or spoiling the rope, so do it well, taking all the time you need. Mark it plainly so that when you start with the knife you will not be guessing, because once you make a small error it will get bigger as you go, and spoil the whole rope with a weak spot or spots.

Now, if you have judged your time right and fleshed the hide carefully, and if you have maintained the shade well, the hide will be firm, but still evenly moist enough to cut, and it will be possible to sit down in the one spot and, beginning at the outside, spin the hide into your knife. If you are unlucky and everything is not just right, then it would be best to start at the middle and cut out. Your knife must be sharp, very sharp, and again, you have all the time in the world to do this, so take your time and do it well. A small slip will put a nick in a strand, which will mean a weak spot in the rope.

At this stage, some men get a broken bottle and trim off the hair over a log, but I like the hair on while making, and trim it afterwards, or let it wear off when it is being dragged; but as you will.

TWISTING THE ROPE

Now to set up the twisting of the rope. This seems to be the spot where most people go wrong. The usual custom is to spin the rope up on the wagon wheel, but to my mind this is an awkward way to do it, and a perfect job cannot always be made because of certain practical difficulties; nevertheless if you would like to make it this way, here is the method.

Jack up one wheel of the wagon (a buggy is not heavy enough).

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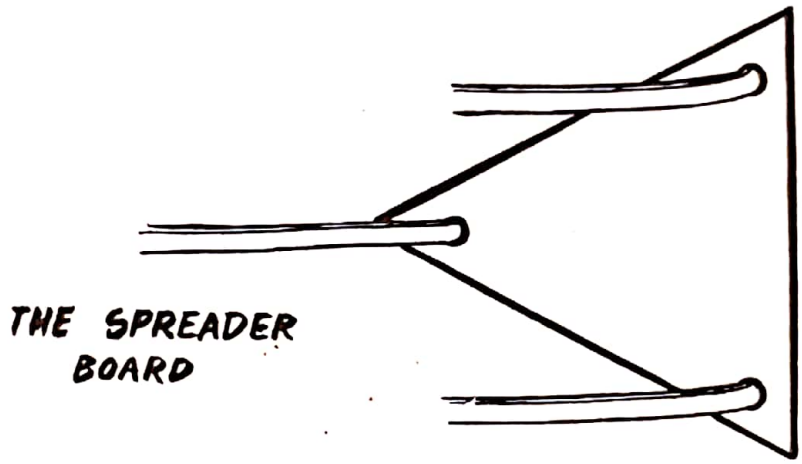
and to each of three widely spaced spokes, attach an end of hide. Thread a spreader onto the three lengths of hide and step out forty feet, which is the length of the strands to make a rope of about thirty feet. Attach the ends of the carefully measured strands to the end ring of a hobble chain. (Three small Turk's Heads through carefully punched holes look well and are strong for the fix. I sometimes run one pair through the ring and twist the third into the rope; this is easy and strong, but the third end needs trimming to make the start of the rope even. A third fix is to trim each strand, pass it over the ring and bind until twisted in, but this has to be very well done to be strong).

The spreader is best made out of the end of a kerosene case with inch holes nine inches apart, in a triangle.



THE SPREADER BOARD

Fix the end of the hobble ring to a bag of sand and spin the wheel, keeping the spacer moved along as the rope gets tight. The sand will drag. It takes about half a corn bag to get the right tension.

My method is to make two gadgets, as illustrated, out of 10 x 3 hardwood, well morticed into each other, with the upright in each case about nine inches from one end, and the bottom board an overall length of three feet, with upright about two feet six. One has three windlass handles made of 5/8 steel with hook sticking out as shown, and the other one has one windlass-style hook and handle.

Tie one end to a post, the end with the three hooks, and the other end has a bag of sand on the bottom board for a weight, or better still, a heavy anvil.

Fix the forty feet strands onto the three hooks and, before hooking the hobble chain onto the other end, put the spreader on to the three strands. You can't make a rope without a spreader; it serves to keep the strands apart as you twist up

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the rope.

Now wind each of the three handles two hundred times. That's about right, but it will depend a little on the condition of the hide. They won't need tying, as they stay in place with friction of the steel handles through the timber. Start winding the handle marked "A" with the spreader as near to "A" as you can get it and as the rope twists, the spreader moves along the rope towards "B". Watch for back twists in the hide near "B"; these are usually a sign of bad cutting but even the best will get them.

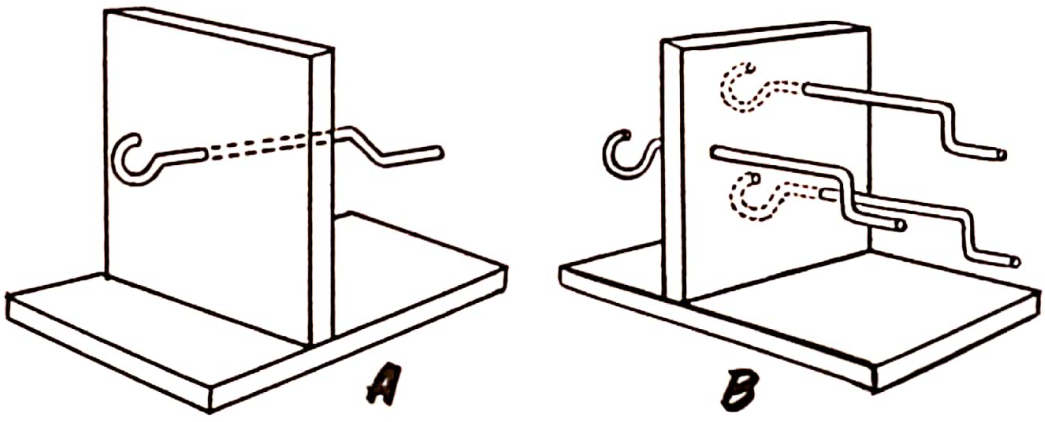
The one-handle drag post will start to slide and I usually put a flat wide board under it to save it digging into the earth as it goes. It will slide ten feet before the rope is twisted right along.

Now bind well with a thin rawhide strand at the end "B" where the spreader is finished but, of course, behind the spreader, and about two inches from where the rope will be cut off leaving the ends attached to the "B" end hooks.

Leave the rope thus to dry for a week or more, without fat or any dressing but in the shade if you can. Keep a small weight on it.

When you are sure it is perfectly dry, and not before, take it off and attach the hobble chain end to the back of a truck. Let it drag for forty miles on a dusty, but not gravel road. It will have all the hair off and be smooth and pliable, but now is the time to give it a light dressing of beef fat and let the fat dry into it.

The working loop is best made with a piece of single trace, two inches wide and a foot long, with inch holes punched in each end and one in the middle. Wrap the hide twice with the end of the rope through all three holes and finish with a turks head to keep it there.



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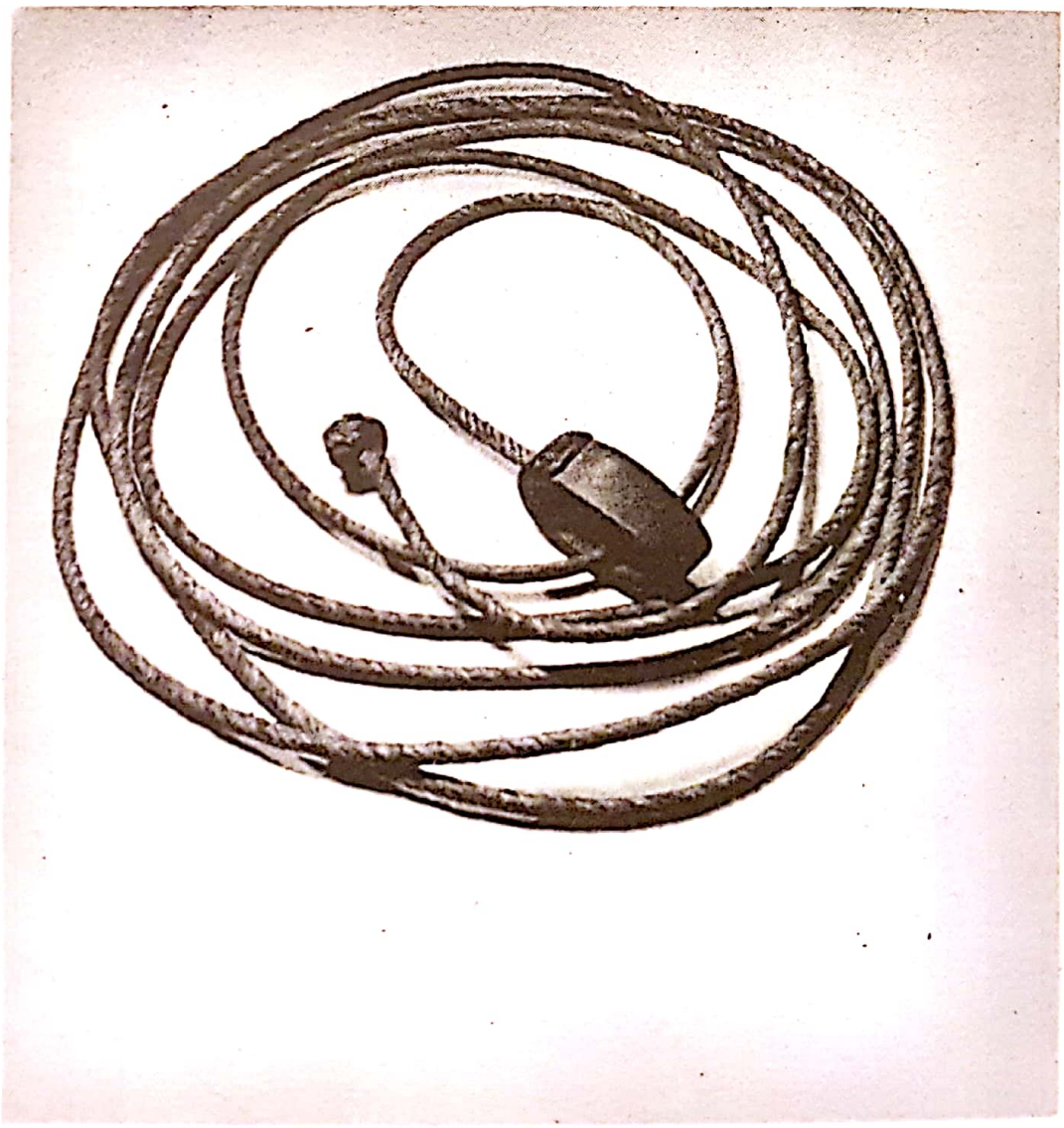
Another way of making the loop on the bound end is to splice it back by wetting the ends a little and putting a rawhide honda on the wearing spot. A third way is to splice a steel ring onto the end, but the rings bend and rust and brass is too weak. The best is a heavy leather loop.

Leg ropes are best made by taking a full length rope made on a single ring instead of a hobble with swivel, and by cutting the rope in half and splicing the ring, you thus have two leg ropes.

NOTE: In the rough sketches of the twisting posts there is an extra piece of wood at the back of each handle. This gives more of a bearing to the handles and it is important to grease the holes as you put the steel into them. Make a short hook on an anvil and put the rod into the posts, then bend the handle to the crank shape.



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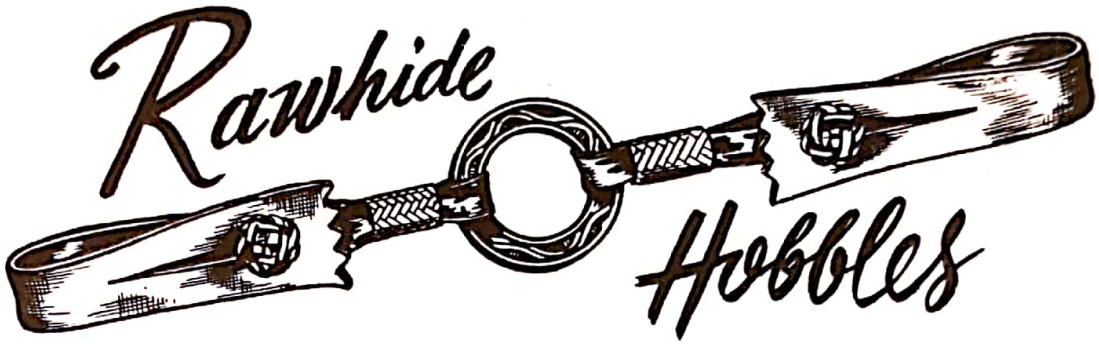

Rawhide work is almost a lost art among the bushmen. True, there are a few who can twist a rope or make a plain hobble, but there are a lot of things you can do with Rawhide and I would like to see more gear made in the camp. The making of knots and splices is a grand hobby and every bushman should have a Rawhide headstall in his pack.

Here is a neat little pair of light hobbles. A tidy light piece of gear that any man would be proud to hang on his strap.

The centre ring is $2\frac{3}{4}$ in. across outside measures and can be sterling silver or a plain nickel ring. The sterling silver cast in a clay mould and polished, is a nice piece of equipment and fairly easy to make if you have a blacksmith's forge to melt the silver and "a little bit of silver in your purse."

The straps are Rawhide made by cutting strips of Rawhide 1 3/8 in. wide at widest end, tapering to $\frac{1}{2}$ in. and cut $19\frac{1}{2}$ in. long. Use $1\frac{1}{2}$ in. to make a square Turk's head on the knot and plait a four-strand Turk around it.

Now double the narrow end around the ring and put a gaucho knot $1\frac{1}{4}$ in. long near the ring.

Punch a $\frac{1}{2}$ in. hole $1\frac{1}{4}$ in. from the large end and split it back $2\frac{3}{4}$ in. Now work the Rawhide with fat until it dries, and keep working it until it gets reasonably soft. The finished overall length of the hobble is $17\frac{1}{2}$ in. Rawhide has been used for generations as hobble straps, and except for the fact that water affects them, they would be the most suitable material to use for hobbles as they hold the knots better than leather and once they dry, are as firm as steel. Those who are interested in making these Rawhide knots should keep illustrations such as these, because the working of Rawhide is a dying art and most of the old hands who were masters of the craft are not with us any more.

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THE GAUCHO KNOT

Any readers who have difficulty in making this knot might write and let me know, because there are several tricky little things which, if not observed, would spoil the knot.'

For instance, after having turned back the first time and meeting in the middle, note that each of the strands, coming from the right hand side must go underneath those coming from the left, and that from the moment they meet, they pair up for the rest of the round. I mention this point because it is one that used to stop me, and my knot was never complete.

A useful hint is to practise this knot with 3 strands of different colours.

Fig. 1. Three strands are spaced around the work and tied down the length of the knot required. Twist them so they spiral around, evenly spaced as illustrated.

Fig. 2. Start the braid on the left hand side by bringing each end OVER one strand and under one, as illustrated. On the right hand side bring each strand UNDER one and over one. Keep passing over one and under one until the strands from each side meet in the centre.

Fig. 3. Note, that as mentioned previously, the ends of the SAME strand meet, the end from the right passing UNDER the end from the left. Continue the under-one over-one sequence until the strands which now form pairs, are at the outside edges of the knot, as shown in fig. 4.

Now bring the left hand ends back, each passing UNDER two and over two, splitting pairs each time. The strands on the right are brought back OVER two and under two, also splitting pairs. The ends will meet again as shown in fig. 5, and the knot is now complete. Work this out so that these joins are evenly distributed throughout the length of the knot, to avoid a lumpy appearance in one part of the knot. Tuck the ends under and cut them off neatly.

This version of the gaucho knot is most suitable for the short knot required on the hobbles. When making a longer braid, a herringbone effect, as shown in fig. 7, can be achieved.

Wind the strands around, and braid them up to the stage of fig. 4. Now, take the ends on the left OVER two then under two over two, etc, splitting pairs as before. The strands on the right are passed UNDER two over two.

The disadvantage of the herringbone braid done in this manner, is that there is an over 3 sequence at each end, which does not stay in place very well.

To overcome this, pass the ends on the left UNDER two, then over ONE, under one, then over two, under 2, etc. On the right side reverse this procedure.

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THE GAUCHO KNOT

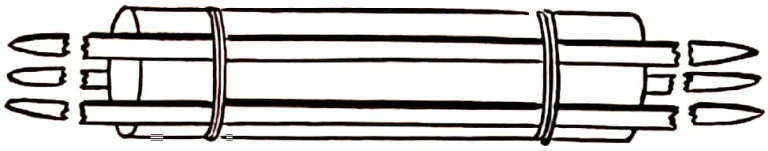
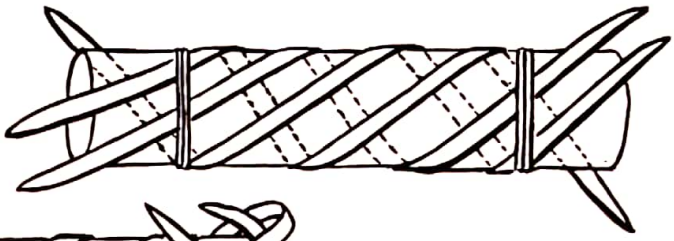


FIG. 1

FIG. 2



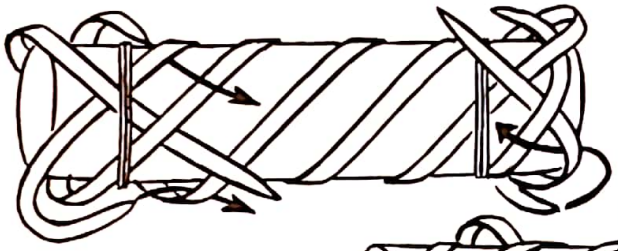


FIG. 3

FIG. 4

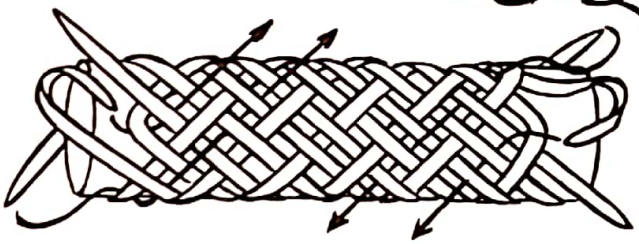


FIG. 5

FIG. 6

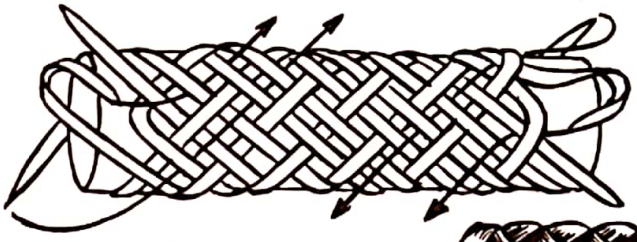
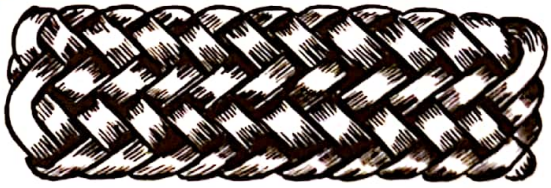


FIG. 7

FIG. 8



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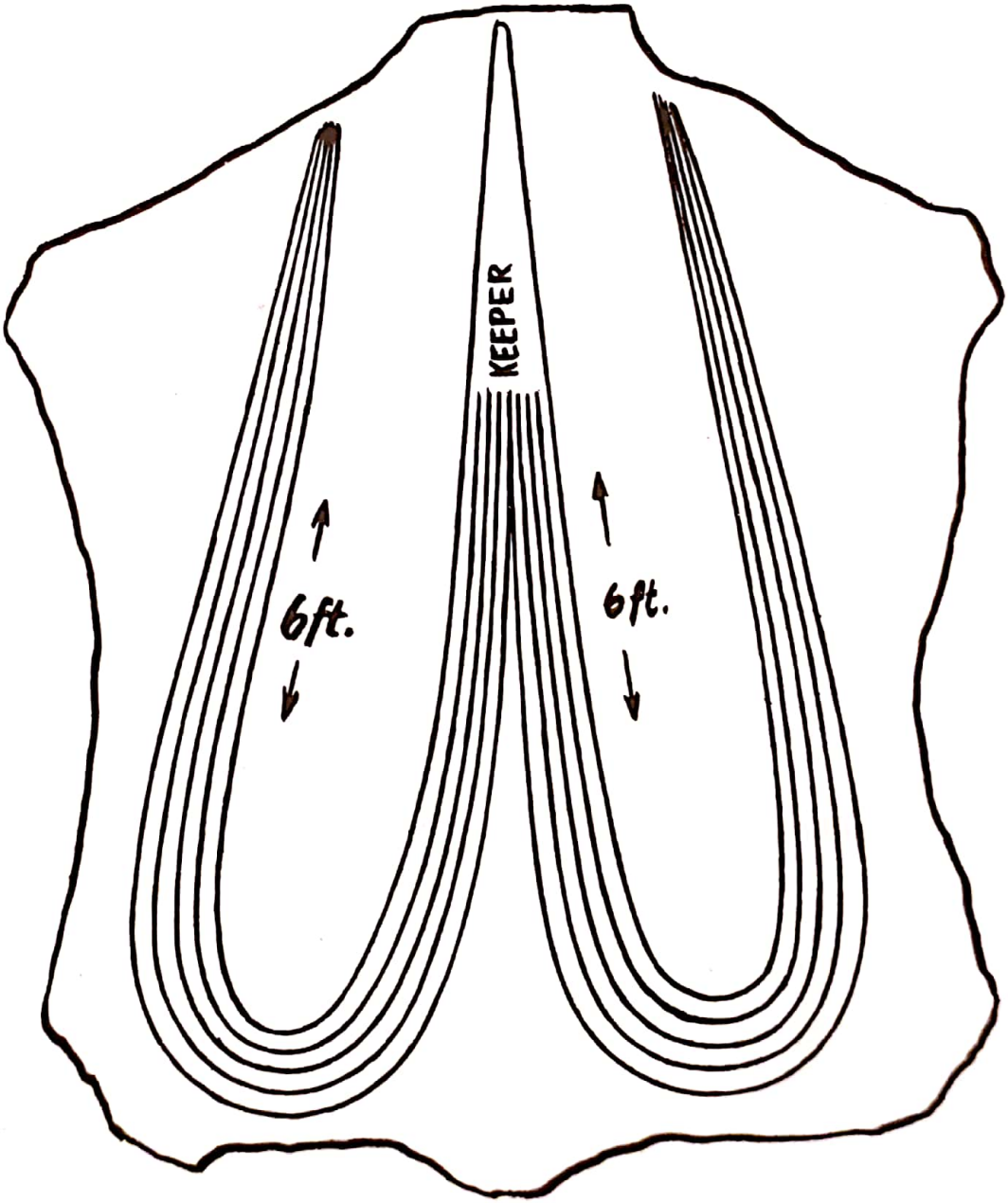
WHIPS FOR HARD WORK FROM RAWHIDE

A raw hide whip is the most durable whip you can have... but it must be heavy and for this reason a belly of short lengths of steel wire or speedo cable are the best. Two feet of old speedo cable works well. Cut the strands from a full hide which has been pegged and partly dried. Instead of going round and round the hide as with Kangaroo hide cut the strands two lengths of the full hide by starting with a long keeper in the neck and turning back at the tail and going back up the sides, four strands going each way - see Sketch.



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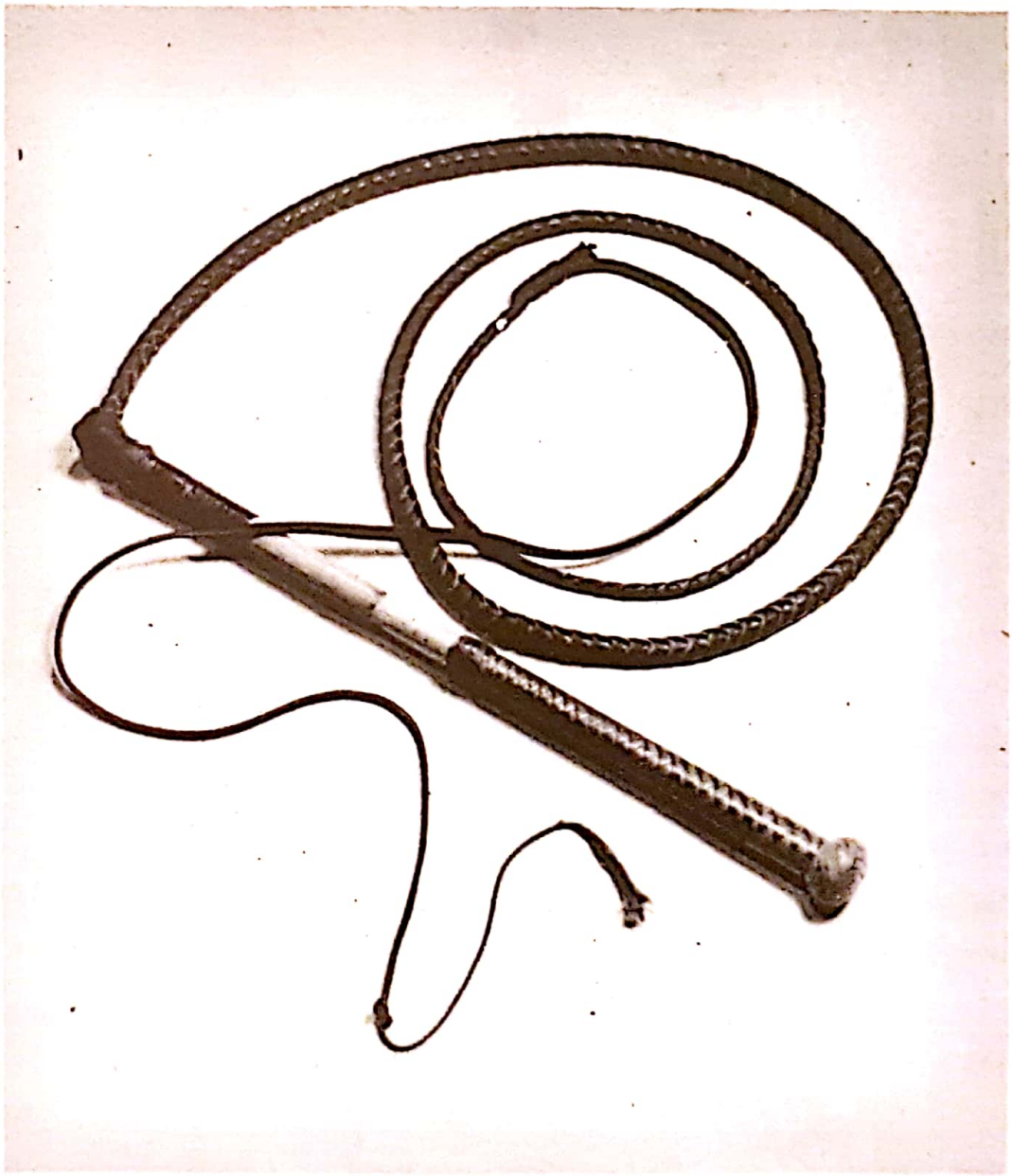
The belly is best plaited over with thin greasy kip (see whip section) and the full length of the plaiting should not be more than seven feet as that is the longest practical length obtained from a medium hide.

The tail and the fall are exactly as in the usual whip... number of strands should not exceed 8... six can be plaited quite well... four is too coarse... try the strands a quarter skived well on the edges and trimmed a little at the beginning. After two feet or a little more trim them again slightly as you go until they are about an eighth at the finish... do not attempt to make the tail too thin.



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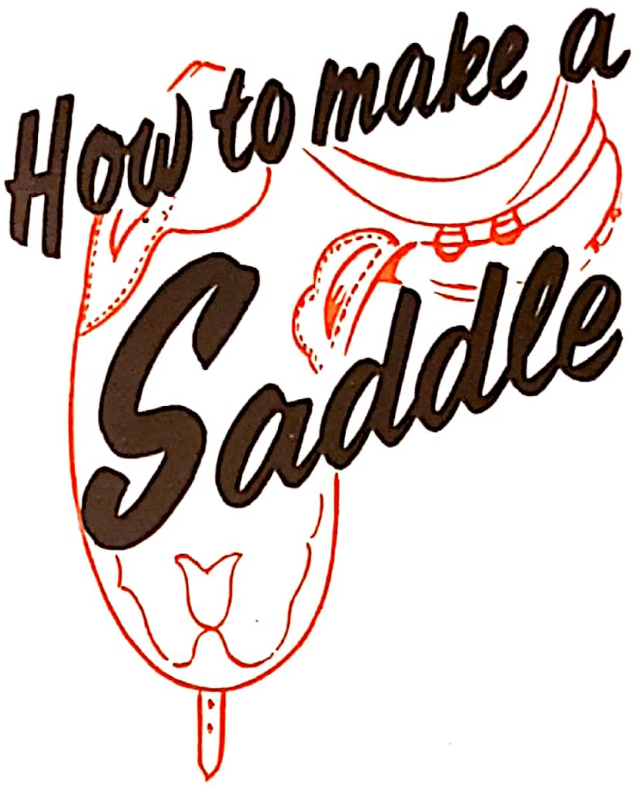

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SADDLERY

The following articles are a complete but necessarily short story on how to make a saddle beginning with the tools, materials, the use of tools and the details of one style of a saddle.

TOOLS

Let us begin with a list of tools so that we become conversant with the names, and I will devote this article to a description of the various tools used and a short article on the use of each of them.

AWL

The awl (shown here) is the best type for every-day use and consists of a diamond shape blade stuck into a wooden handle.

The awl blade must be sharp and if you are going to do various sizes of stitching you will want a selection of sizes of these blades, and they range from about 3 in. to about $1\frac{1}{2}$ in. blades.

The awl is held in the hand as shown.

There are awl handles on the market which will take any size blade.

SADDLE CLAMPS

All stitching is done in clamps because two hands are needed for expert stitching and practically all saddle stitching is done with two needles. Clamps are held between the knees as illustrated.

There are a variety of these clamps on the market, one of which is built in the form of a seat but for all practical purposes the loose clamps illustrated will suffice.

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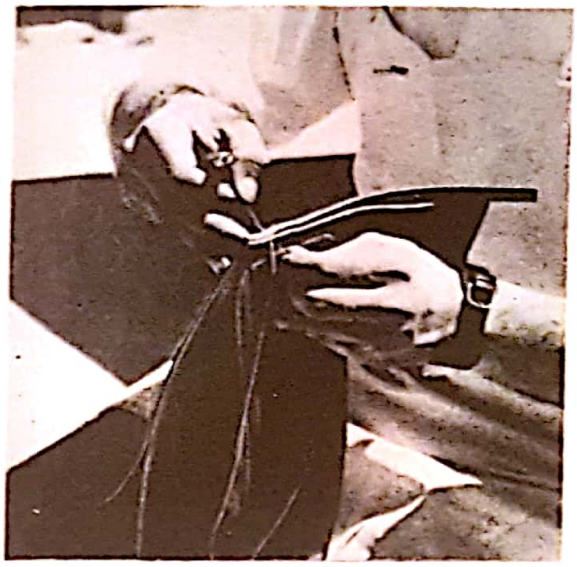
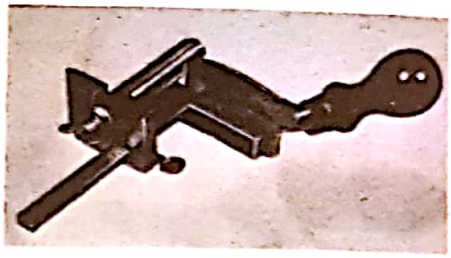


THE SADDLE CLAMP IN USE

PLOUGH GAUGE



PLOUGH GAUGE

This is an essential part of every saddler's equipment, being used to cut all straps after the edge of the leather has been straightened.

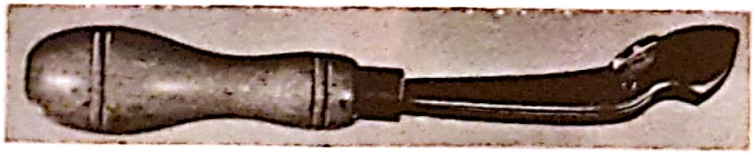
EDGE TOOLS

There are a variety of sizes in these; they are known by numbers ranging from 1 to 6.

This tool is used as illustrated in the photo at left.

CENTRE CREASE

There are several varieties of these, the screw crease (illustrated) and the centre crease (illustrated).



SCREW CREASE

The screw crease is most universally used, but special markings on saddles are made with the centre crease. The edge of this tool is usually heated, preferably with a gas flame.

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EDGE POLISHING IRON

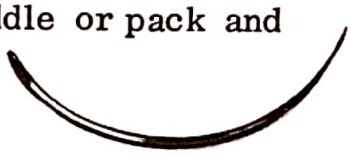
This has a hollow face and is used to polish the edge of the leather work. It is also used hot and dipped into wax as used.

NEEDLES (HARNESS)

These are made in sizes 0-6 and have a blunt point.

NEEDLES (COUNTERLINING)

These are used in relining or lining a saddle or pack and are made in sizes 2 in., 3 in., 4 in. and 5 in.



SEAT STEEL

This is used to put hair into the panel of a saddle, and is necessary for making or lining a saddle.

SADDLER'S KNIFE

A round knife specially made for saddlers and used on all kinds of harness strapping and leather cutting and shaping.

PUNCHES

Sizes 1/8 3-10, $\frac{1}{4}$ 5-16 round. Sizes 20-26 in ovals.

These are used or all strapping and buckle work with a special tongue punch for large buckle work.

Now for the use of the tools described.

Take the making of a simple bush stirrup leather. This will involve the use of (1) a gauge to cut the strap, (2) an edge tool to clean up the edges, (3) staining the edges, (4) punching the holes, (5) sewing on the buckle with needle and thread and clamps.

1. Straighten a side stirrup leather or a stirrup butt with a straight edge and a knife, and plough off a $1\frac{1}{4}$ in. strip

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with the plough gauge. Cut to 60 ins length.
2. Trim the edges with a No. 2 edge tool.

TO STAIN AN EDGE

3. Stain edge with Bismark brown for preference, or Condy's Crystals if you have no proper stain. Use a stain dissolved in water, and a liquid glue of any type. Mix the stain and glue well and apply it to the edge with a piece of felt. Rub down and shine with a piece of fine, soft canvas. Cloth will not do - it is not quite hard enough.
If anyone cannot manage to get a good finish, write and tell me and I will try and help you. Send a sample of your work.

TO PUNCH THE HOLES

4. Use the oval punches and mark the holes $1\frac{1}{2}$ in. apart, starting the first hole 3 in. from the end and put 12 holes. Number the holes and make each hole in each leather exactly the same distance apart.

TO SEW THE BUCKLES ON

5. Now to make a wax end. Drive a nail into a bench and cut the top off the nail. Take a ball of hemp (common No. 2) and holding one end, loop over the nail and back to the left hand. Unwind the ravel on the right leg and break. Repeat this three times. Roll the three threads together on the leg, wax well and thread by putting the point of the needle through the waxed thread about 3 inches from each end as shown.

This is a simple thing to do once you are shown the correct way. Make sure to taper the point well before waxing and it

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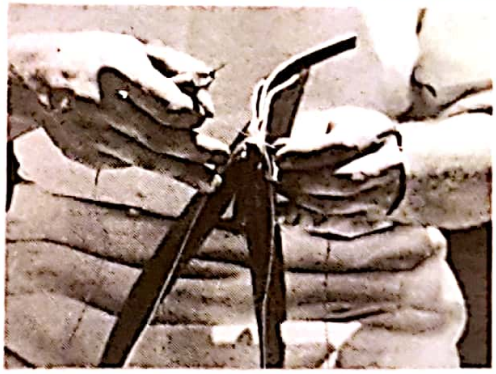
will lie in the needle better and be easier sewing.

Punch the buckle hole with a $\frac{1}{4}$" in. oblong punch and mark the stitches with a pricking wheel.

Punch a hole in the leather as shown in Fig. 1 and with the left hand insert the needle alongside of the awl (Fig. 2). Push the needle half way through, removing the awl at the same time. Then with the right hand the other needle is inserted, (Fig. 3) and both are pulled through.

1

2



3

LEATHERS

Before starting on the making of another article, I would like to say a word about leathers, giving some uses of each type.

KIP

This is the most useful for bridles, girths, pack bags, saddle bags, most pouch work, under saddle flaps; and light kip is first class for saddle seats used flesh out.

HARNESS LEATHER

This is heavier than kip and is a fairly varied type, ranging from extra heavy 'single trace' to a light flap leather used for the best saddles, so that when buying harness leather it is necessary to know what the harness leather is to be used for -

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light flap harness, especially prepared for saddle flaps, also suitable for cutting bridles, or the body of a surcingle. Large spready sides aressuitable for pack bags and for collars.

Heavy trace leather harness is useful for hobble straps, bronco gear, breast plates, straps, breaking gear straps and anywhere that the heaviest leather is needed.

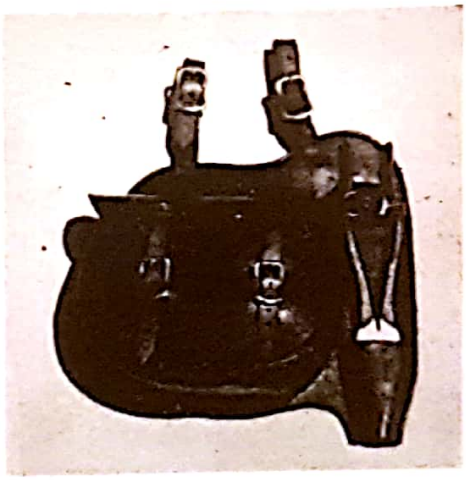
Another leather which is very handy to the amateur saddler is dry bag leather. The uses of this leather are for girths, saddle seats, saddle pad covers, and it is a useful leather for making writing cases.

SADDLE BAG

Below is an illustration of a saddle bag. These are made in right and left hand, for near and off side of the saddle. On each side of stock saddles there are two saddle dees. These dees are designed to carry a saddle bag and quart pot pouch, so that in making the saddle bag the dee straps must be placed the correct distance apart to fit to these dees of your saddle.

The saddle bag is made up of four main parts. The back (light harness or stout kip), the front of the pouch, the gusset and the flap.

The gusset is sewn on to the front of the bag inside out with a piece of leather between the stitching (used as a weldt). Turn this inside out and trim the gusset off with an edge tool.



Next sew the gusset on to the back. The last operation is sewing the back and the flap by hand with a row of stitches across the top of the bag. Anybody who would like a paper pattern, please write, and I will be glad to send one.

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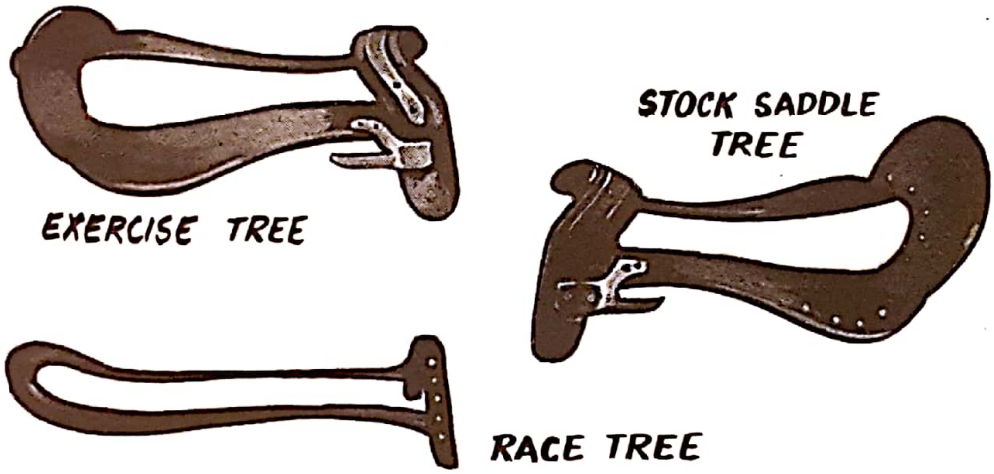
HOW TO MAKE A SADDLE

This subject could take up a thousand pages and make a very dry book, but I will set out the main steps in making an Australian type saddle; starting at the tree, selecting of leathers, and the details of seat flaps and panel.

THE TREE

All saddles are built on a tree of some sort... Australians use mostly a wooden shape reinforced with steel.



These trees range from high back stock saddles to flat race trees, but are all much the same on principle. With the exception of the race tree and some exercise trees, they have bars to hang the stirrups and are developed from the old English hunting saddle.

We will suppose that you want to make a stock saddle - that you are average height and 11 stone in weight; then you will most probably take a tree that is 15 inches from pommel to cantle. Cantle is the top of the back of the seat - 15½ might be more roomy but that is about the fit in Australian makes of trees. Order a tree which is the depth of seat that you like. Rasp off any rough edges.

NOW TO STRAIN THE TREE. Get a yard of 3 inch English saddle web and a packet of blued saddlers' tacks, about ¾" in size. Wet and strain the web, dry and wet it twice, so that if a saddle gets wet the seat will not stretch.

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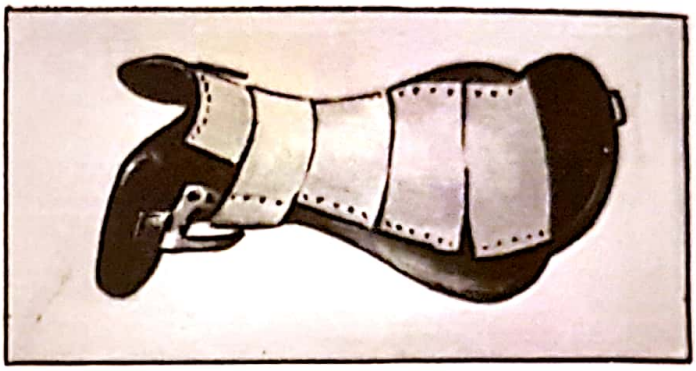
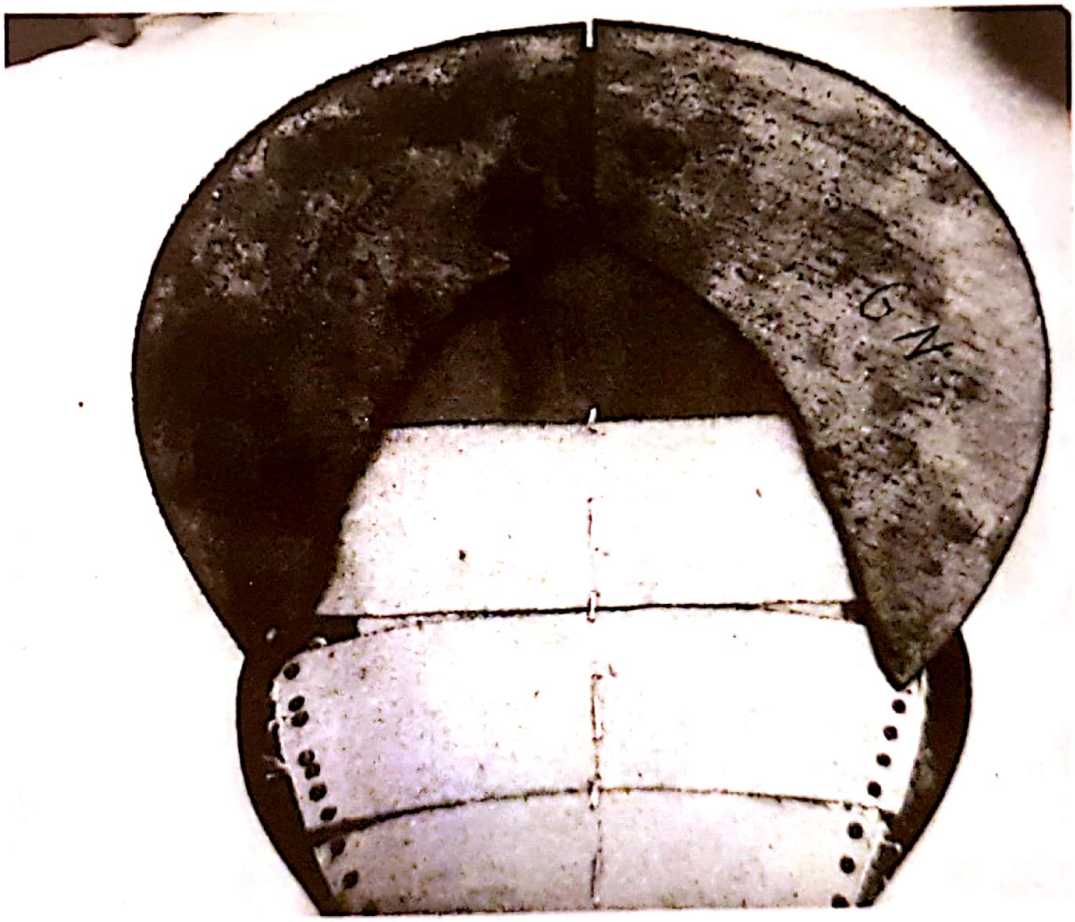
Tack it to the head of the pommel and to the back, feeling the shape and dip as picture. Note the slope of the web, and that a piece of leather is tacked across under the web.

STRAINING A TREE



The back of the tree is now styled to shape and height by adding leather. This leather is cut in three pieces - two for the front and one for the back. The shape is the saddler's secret, but you can experiment and get the shape right.

This and the following page shows illustrations of the pieces of leather used and the three pieces tacked into position.



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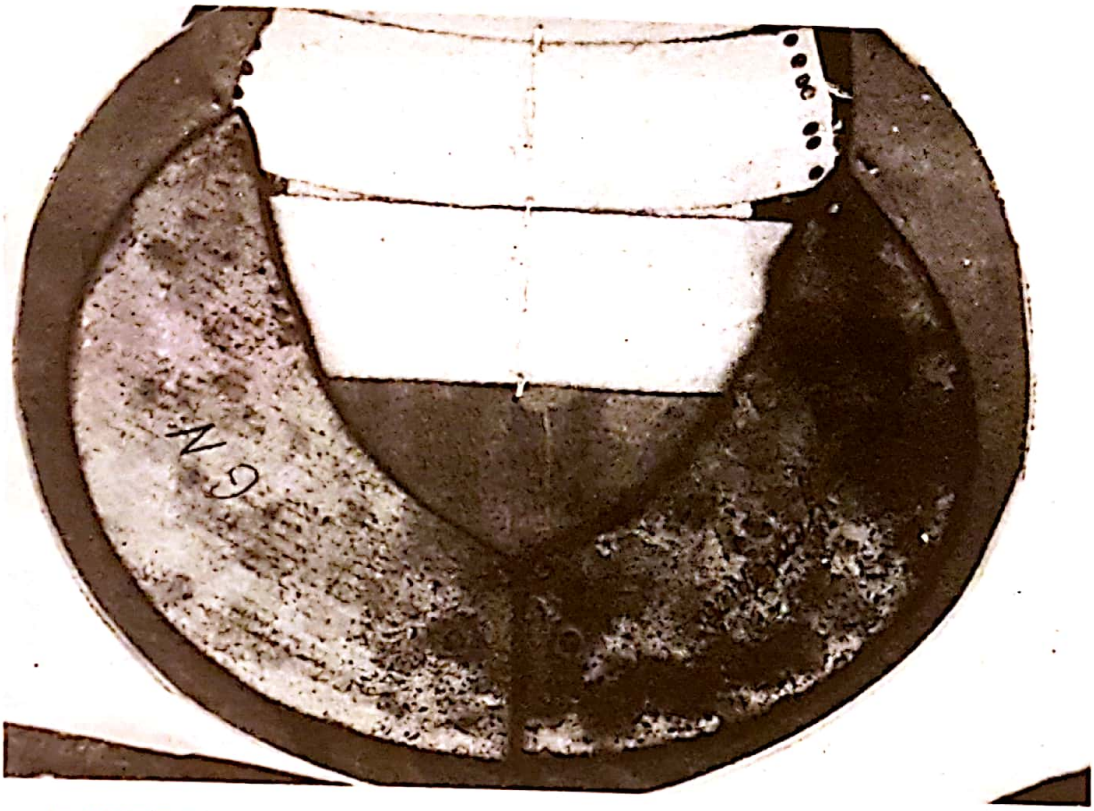

PADDING. Now to cover the wood with padding. For this the usual method is to use doehair and sugar bag. Nail the bag into position thus, and with a long seat steel push the stuffing into position, awling it even with a seat awl.

A roll on the back of the seat is made by nailing a strip of kip to the wood, rolling it backward and gluing it to the back of the seat. When the bag cover is put on, it is sewn through as shown.

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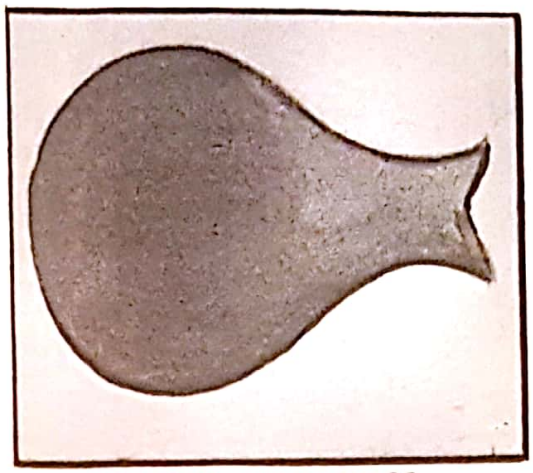
BLOCKING THE SEAT

Take a piece of dry bag or dry kip leather this shape (measure the rough pattern off the seat to be covered), and soak in water for six hours, and mellow between damp paper for an hour.



LEATHER CUT TO SHAPE

TACKING THE BACK JUST ABOVE CRUPPER BAR

Tack it securely to the back part just above the crupper bar and spread the waist.

Put a tack one each side of the seat.

This will leave a surplus of leather.

Now divide each of these wrinkles as below and put a tack in each division without pulling too hard. (Cut at suitable places.) When each wrinkle is about 1 in. apart, rub out with a bone or wooden slicker thus:

RUBBING OUT THE BACK WITH A BONE

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Pull the sides tight and nail.

The fore part, it will be noted, has not been tacked up till now, and does not need tacking until last. The seat is then left to dry ready to be marked out and have skirts sewn on, as will be illustrated next chapter.

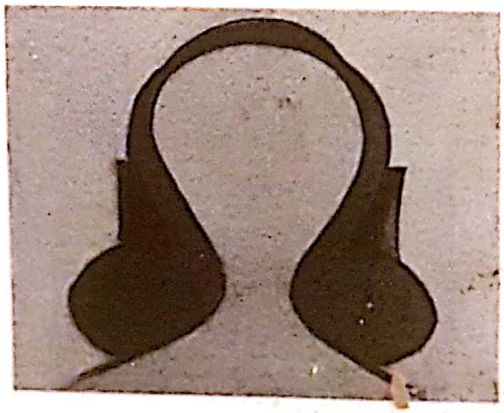
Note a few MUSTS in blocking a saddle seat:

1. The sides of seat are to be pulled in first.
2. The fore part is not tacked until last.
3. The back surplus is not pulled tight, but is slicked into position.
4. Put a bag of sand on seat till it dries.

BLOCKING COMPLETED

The next stage is to mark out the seam where the saddle seat will be joined to the skirt.

Below you will see the picture of what is known as the skirt. This is the piece which is sewn on to the seat and serves as the cover for the stirrup bar, and also to this is attached the draw-down or piece of leather which pulls the seat down firm and which is used to tack on to the tree.



THE SKIRT

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Another illustration here shows the draw-down and how it is sewn on the skirt before the skirt is sewn to the seat.

Draw free-hand the style of the skirt which you require. You can use the previous illustration as a guide or if you get so far that you cannot decide what shape it should be, write to The Xpert, C/- "Hoofs and Horns", and I will shape a skirt for you.

You will note that the skirt extends right around the crupper bar, where it is joined on to the skirt coming over the other side forming a complete circle around the back. As you can imagine, it is very important that the skirt and the seat are marked with a puce pencil before the seat is taken off the tree where it has been blocked. In other words, do all your fitting and marking before untacking the seat which was described in the last chapter.

Mark the spot at which the front of the skirt is going to meet the saddle seat, because that is where you begin to sew the two together, and if you keep all the pencil marks, both on skirt and seat, together as you come around with the stitching, one or the other will not become stretched.

Now to sew these two together - using a piece of fine white leather or kangaroo as a welt; if you look at your saddle you will see what the welt is - it is a piece of leather especially put there to protect the stitches.

In this article is a photo of the seat and the skirt being sewn together. You will take special note when coming around the back that there is a fullness in the seat leather which has to be tucked in if it is to match the marks made on the seat before it was taken off the position in which it was blocked.

THE DRAW-DOWN AND HOW IT IS SEWN TO THE SKIRT

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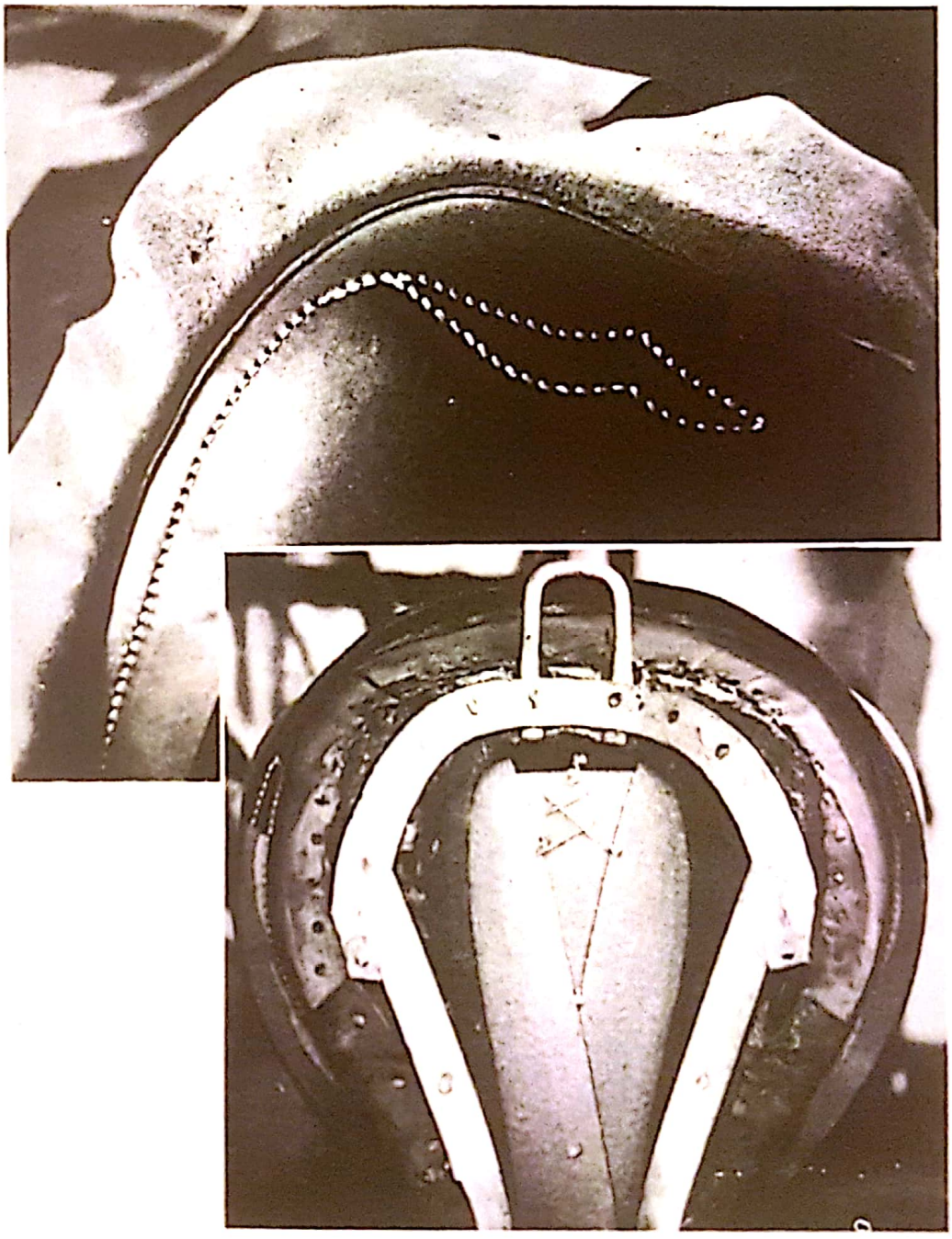
Take special note when preparing these pieces of leather for stitching that a quarter inch has to be allowed on the edge of the seat, and this quarter inch should be skived so that it will sit down nicely when the job is finished.

When the sewing is completed, turn it inside out and it will look like the illustration.

This blocking and fitting of the seat is the hardest part to learn. Care must be taken that the marks of the skirt and seat are made exactly to match, and that when stitching the seat is kept tucked in to fit the marks exactly - otherwise the seat leather will creep ahead of the skirt.



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The sewing of the seat leather to the skirts and the draw-down pieces, is a very difficult operation and easily the most important part of making a saddle.

Before pulling on the seat it will be necessary to run a piece of good quality webbing across the seat to take the girth straps. As a guide to the position of this, the centre of the webbing should about match the end of the stirrup bar and the seat is drawn down on top of this webbing.

Now for the technique of drawing these into position.

The seat, skirt and draw-downs should be slightly damp preparatory to blocking them back on to the tree of the saddle. The blocking must begin by putting the back of the seat into position. It is wise to note here that two small holes should be made in the front of the skirt at a previously determined position when marking the seat which will guide you when you are pulling back the seat. In determining the position of these holes, the skirt can be tacked lightly to the tree when the skirt is being marked on to the seat. (See previous section). The holes made by these tacks will be a guide when pulling back the seat after having been stitched; it is an excellent idea to use a tack in the same hole, one each side of the tree, thus setting the seat in the exact position where it was marked.

A slight tension is taken on the fore part and then pull the draw-downs of the waist in evenly, taking note that the stitching where the seat and the skirt join, come evenly into position.

The wood underneath the head of the saddle is put there to take the tacks used to keep the leather in position. Similarly the wood at the back is there to receive the tacks as the seat is drawn down.

Note from the illustration that the leather is drawn down near the crupper bar, leaving sufficient room between the crupper bar and the skirt for the panel to fit.

The surplus leather which creases in the draw-down near the crupper bar can be cut out by simply taking a V piece out of the leather. Be careful not to strain the seat too tightly and make the line along the side of the seat crooked. This should be very carefully pulled into line, otherwise it will show an irregular line.

FORE PART

The next page shows a small separate piece that is made up to finish up the front of the saddle, known as the fore part. It comprises a piece of harness leather $1\frac{1}{2}$ inches wide, on to

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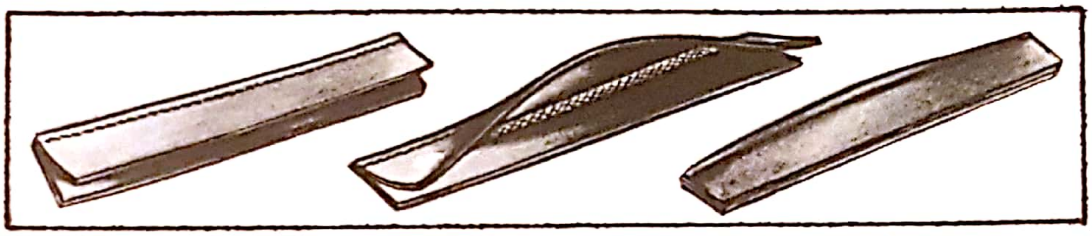
which is sewn a piece of dry bag leather. A cord is placed into position which forms a ridge. (See illustration).

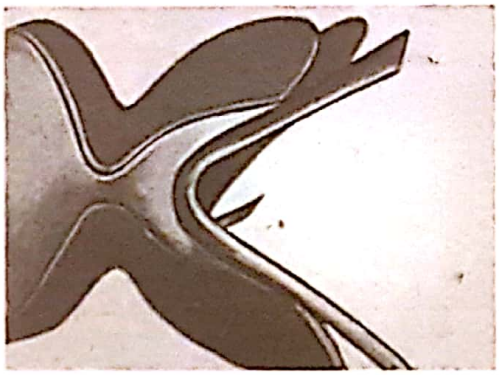
After the seat is drawn on, tack the fore part as shown.

Now sew the girth straps into position with heavy, strong thread.

FORE PART



CORD IS PLACED IN POSITION TO FORM RIDGE



THE FORE PART SHOWING THE PIECE OF LEATHER WHICH FORMS THE RIDGE

THE COMPLETED FORE PART

The modern manner is to discard the girth straps and use only a surcingle over the top of the seat; this makes it unnecessary to put in girth canvas and straps.

TO CUT KNEE PADS

"Illustrations Next Page"

A knee pad is cut as follows: Using a good quality mellow sole leather cut four pieces shaped as "A". Now with slightly lesser quality sole leather cut two pieces each of the shapes drawn inside one another, which are packings for the main pad. Mark on the flap the position that you would like your pads, see "B". Skive sole leather, which I have shaded on pad "A", leaving the bottom full thickness of the sole leather. I have marked dots along the leather which is approximate

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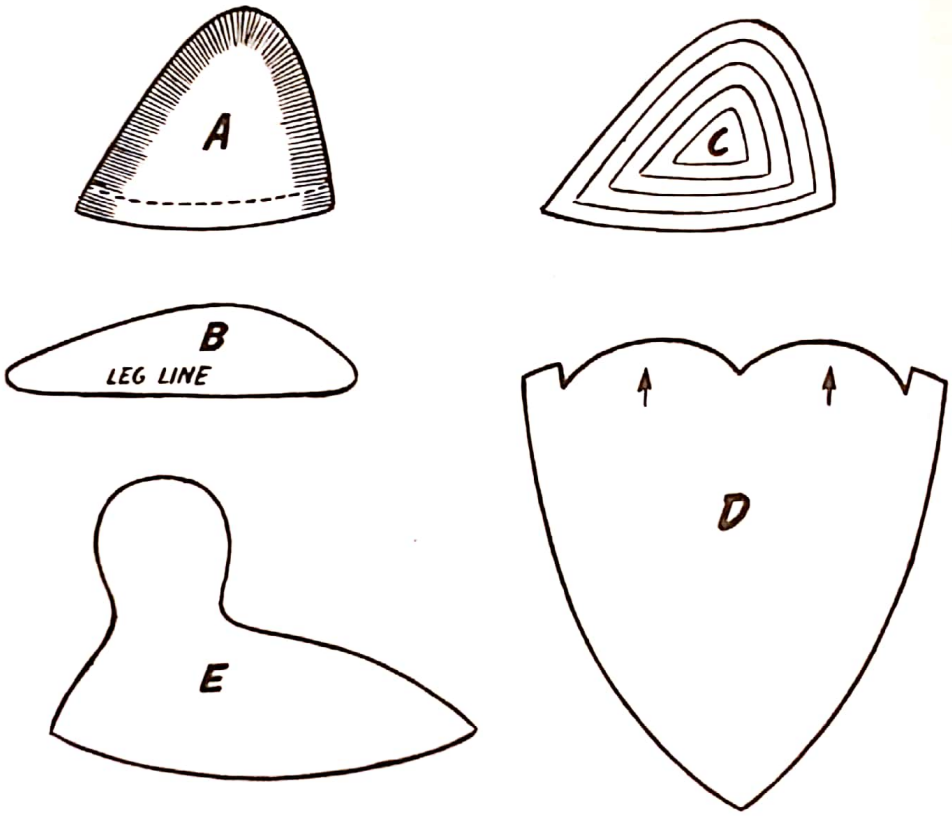
position for the stitches for sewing these outside pieces of sole leather on to the flap. Dampen the two outside pieces marked "A". When these are mellow cut a groove along where I have placed the dots and, using a heavy black waxed thread, stitch two pieces of sole leather on to the flap making the shape "B". This leaves a hollow which has to be filled with the pieces marked as "C". The five filler pieces are best put in dry and glued into position with rubber solution, preferably made into the form of a block shape, and stitch right around the top side about $\frac{1}{4}$" from the edge. It is usual to shape this with the edge of broken glass as a scraper, scraping to the very finest possible point.



Next comes the matter of covering the pad all over; I have drawn the shape of the cover and marked it "D". You will find that the two spots marked with an arrow come together at the top of the pad; oversew these and slick into position with a bone. Then comes the matter of the actual cap. This I have drawn and marked "E". Use bag leather dampened and slicked into position with a bone, then stitched to the cover marked "D" after having been pinned into position on the pad and the whole thing sewn around the base to the flap, using a mixture of paste and resin to stick it to the pad.

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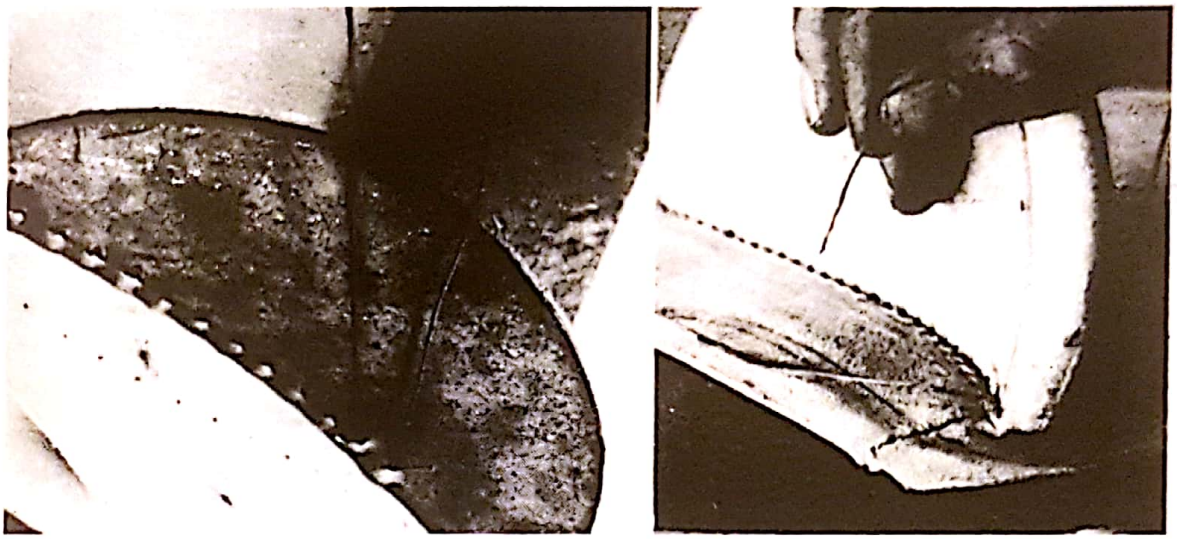
Only practice and experience can teach you how to make a good job of doing this, but to make a nice good-looking job, be sure that the sole leather is scraped to a very fine edge on the two pieces marked "A" before attempting to block your caps. If you are going to have a go at making a set of pads, we will be glad to give you these patterns.

The pads are sewn direct to the flap in a position which suits you... try these for position and once you decide where they are to go make sure that they match exactly... groove the pad about one inch up on both the outside and the inside and sew through the pad and the flap.



SEWING PAD LEATHERS AND COVER TO FLAP

Now sew down the covers onto the flap after the cover has been glued to the pad with a paste made of flour and water... stitch one row close to the pad and one row of stitches out to some fancy shape (see an old saddle). If your pad is not too high you can cover it without a seam by using soft flanky leather and wetting well... block the cover wet using tacks and a cord drawn tight around the base of the pad... this cord will hold the leather as you block it in... it is surprising just how high a pad cover can be blocked without a seam.

FLAPS

Every man wants a different style of flap but the general principle is that the centre of the flap runs down where the surcingle goes over... get an old saddle that you like and cut the flap from it, allowing that the flap has to fit up under the skirt and be nailed to the tree.

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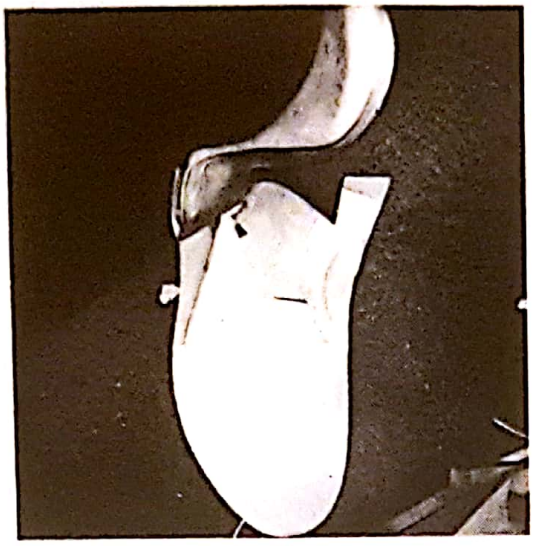
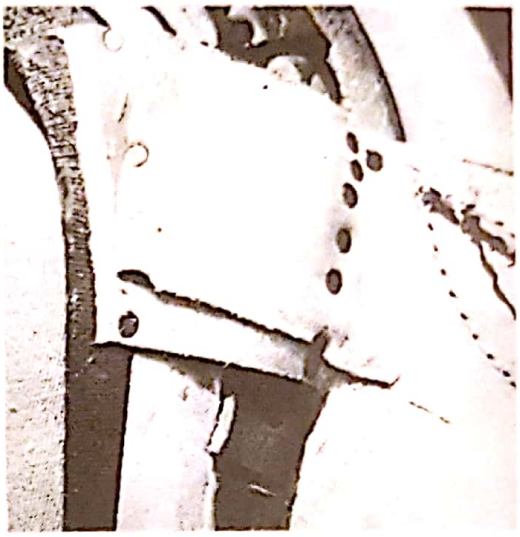


FLAP FITTING
UNDER SKIRT



NAILING PART
OF FLAP TO TREE

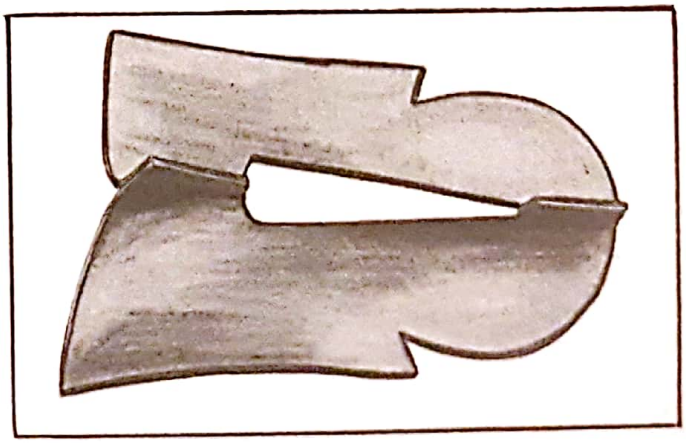
The pads are another matter of personal choice... but here is the method of fixing them to the flap, cutting them out and covering them.

The saddle is in two major parts, the panel being a separate major part and is fitted and made independently of the leather seat. It is this panel that needs repairing constantly, so that if you learn carefully how to fit a panel it will be a very big assistance to you in keeping your saddles in repair.

Now to prepare for the panel. You will require half a yard of serge, 4 lb. doehair (which is a hair off cowhides from tanners, washed, cleaned and dried) 3 lb. good curled horsehair, one 4 in. strip of dry saddler's bag, 1 heavy basil, a half side kip.

The first step is to fit a piece of heavy basil this shape, shown, which is cut on the large side and fitted into the saddle as in the photo.

PIECE OF HEAVY BASIL



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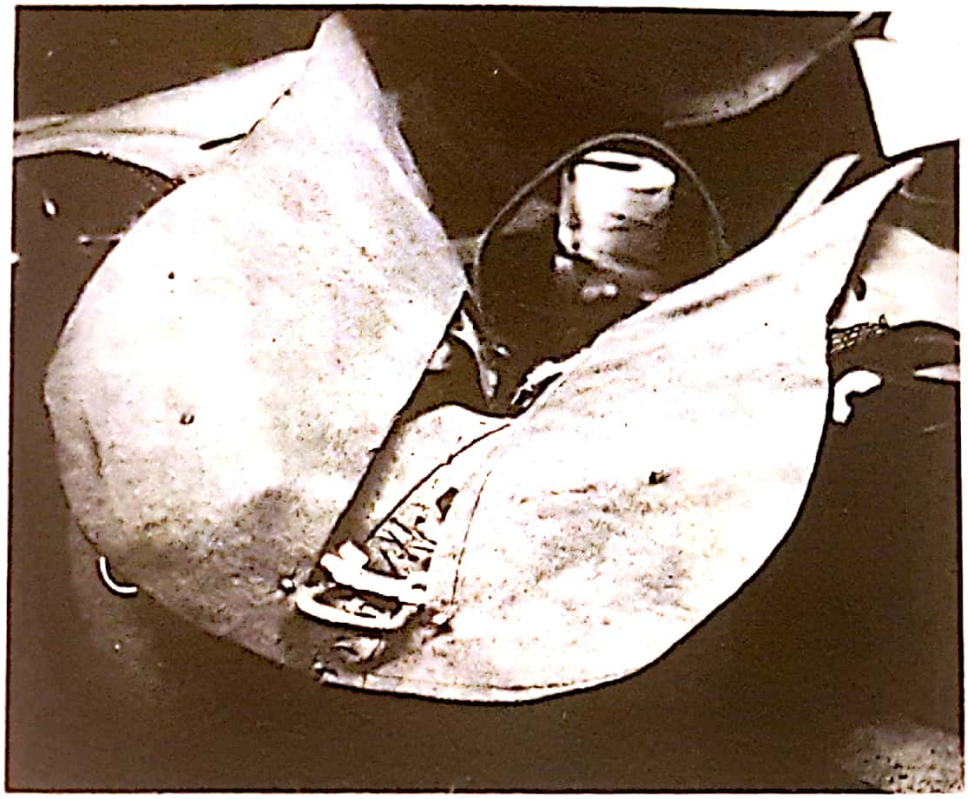
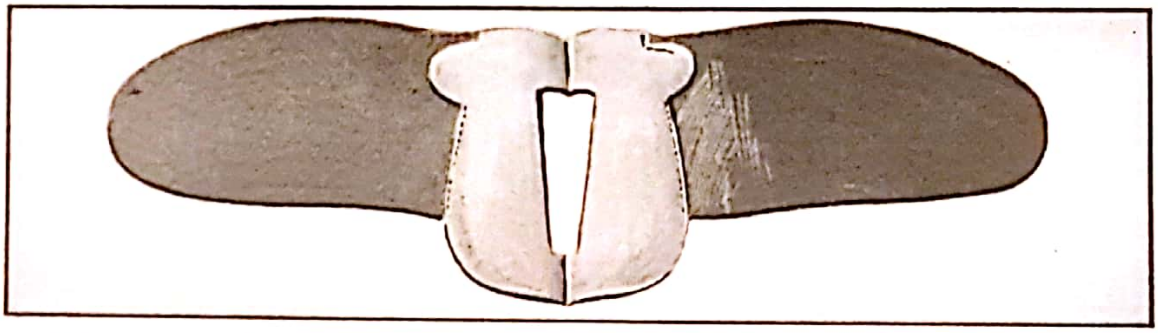


FITTING BASIL INTO THE SADDLE

SWEAT FLAPS SEWN TO BASIL

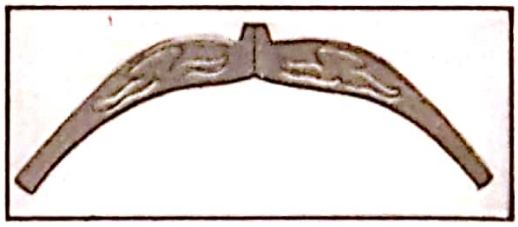


Now sew the sweat flap this shape onto the basil of the panel. It will look like the photo on this page.

A sweat flap when fitted back with the panel should show about $\frac{1}{4}$ in. all around the flaps, because it is designed to protect them and keep them from the sweat of a horse.

Now take two pieces of serge about 19 in. wide, full width material, and lay it over the panel. Peg it there with two awls with the straight top running down the middle of the seat of the saddle; now with a piece of chalk mark the shape of the panel as you think it should be when finished. Looking at an old saddle will guide you in this.

Now prepare the facing, the shape of which is almost a matter of fancy, but the photo shows the general idea.



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Note the join in the middle and that it has an extension which runs under the crupper bar.

Sew this to the basil lining and serge, using the centre as a guide. Only experience will teach you how to bring the point of the facing neatly into the right place with the flap and panel joined. (Have a look at your own saddle).

Sew your serge together in the centre and stitch the serge to the sweat flap along the shape previously marked.

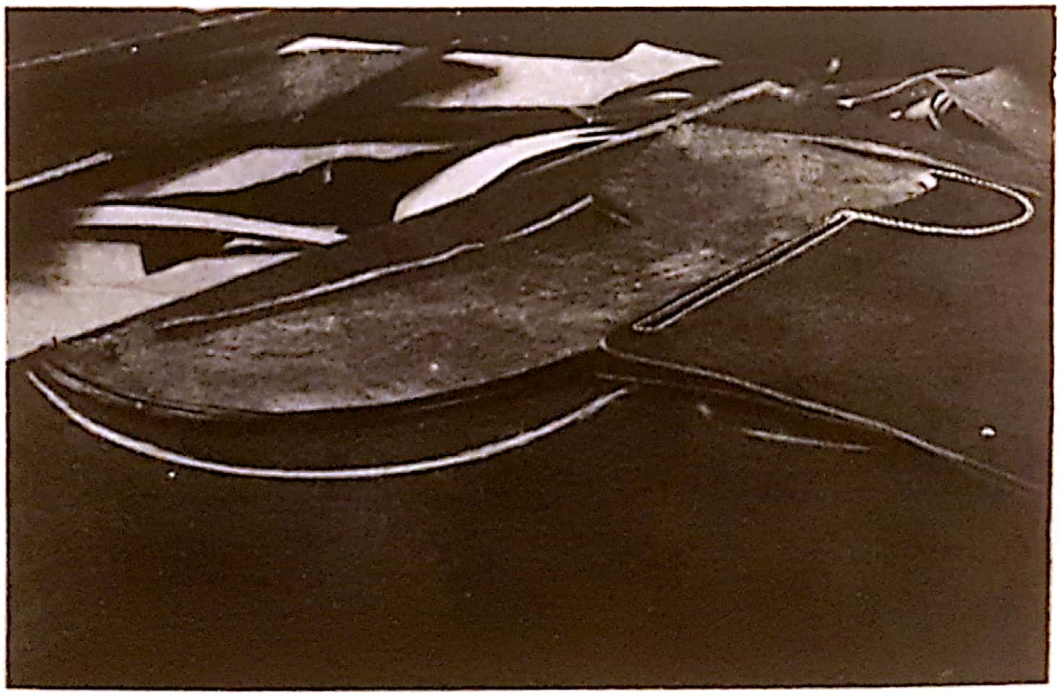
You are now ready to partly fill the panel with doehair, which can be done through a slit in the basil of the panel. Work this into a regular position, taking care to fill the front firmly and tamping material well down into the back, keeping as little as possible in the centre which has a tendency to get too full. Keep beating it down with a smasher.

SADDLE PANEL

Last chapter .we set out a rough outline of how to make a panel for a saddle; now for some details.

CUTTING THE SERGE

Fold the serge and lay the leather of the panel on it thus: Mark it with fullness at the back, as shown below.



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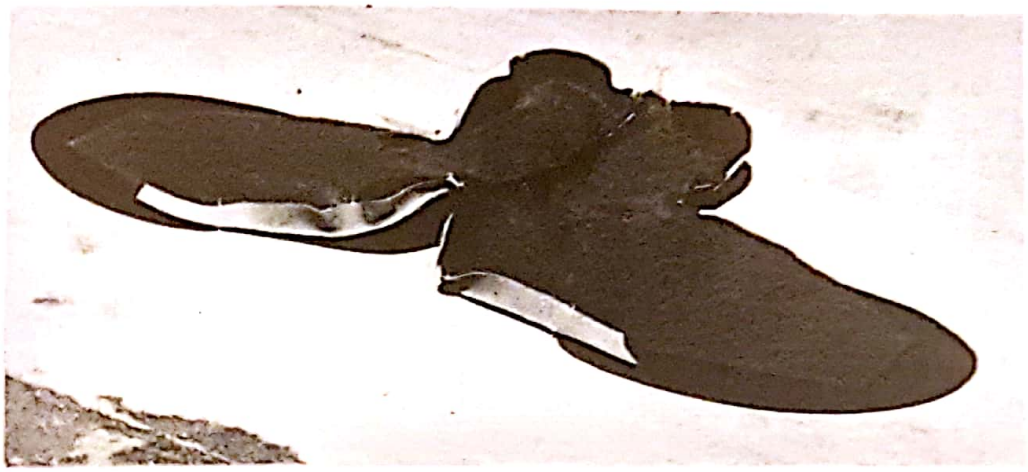
Sew the serge to the leather inside out, including at the same time the front facing which takes the roll. Here is a picture:



When stretching the serge across the panel, leave no slack in the centre at all; when stretching the serge takes care of this. The front needs to be left just the slightest bit loose to obtain the correct fullness.

It is only by trial and error you will find the correct amount of serge to leave in each of these places.

I recommend when making a new saddle that the face directly beneath the serge be lined with fine curled horse hair, although it is not generally done in new saddles. My reasons for this are, firstly, for the purpose of awling a smooth surface; secondly, it is a better padding for the horse's back; and thirdly, the saddle will retain its shape longer.

It is quite obvious you will get problems as you go along that do not occur to me, and every day I am answering letters from people who are using my methods and need assistance; so in this difficult job of making a panel do not hesitate to write and I will gladly answer you if you will enclose a stamped addressed envelope.

Before finishing the subject of panels, a word about making the roll in front where it fits against the saddle itself. This is made by taking a piece of brown paper and rolling it to shape.

The method of fastening this onto the fore part of the panel (look at panel of saddle), is to sew a piece of light shaped leather onto the opposite side of the serge, fix paper onto it, roll narrow facing in opposite direction to serge and sew it down. To get the shape right will take a long time; there are two pieces of shaping in the brown paper to roll and the narrow ends meet in the middle of the pommel.

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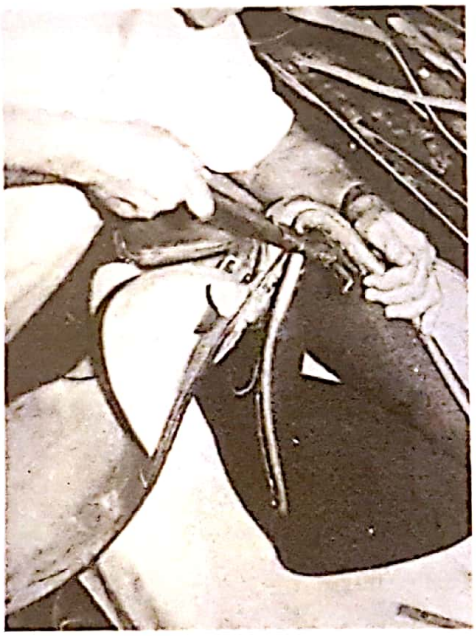
Just another small point while I am on the job. You will find when pulling the panel into position with a heavy cord especially made for the job, that the back of the saddle will fit better if you roll a piece of hessian tightly and pack it in tight where the serge and the leather facing meet. This gives you something to sew to. Pulling the panel into position is such a difficult job to describe that I am printing pictures which might help.

The front is fixed with black saddler's tacks to the wood of the tree down as far as the wood extends and past that sewn with strong coarse stitches to the flap itself.

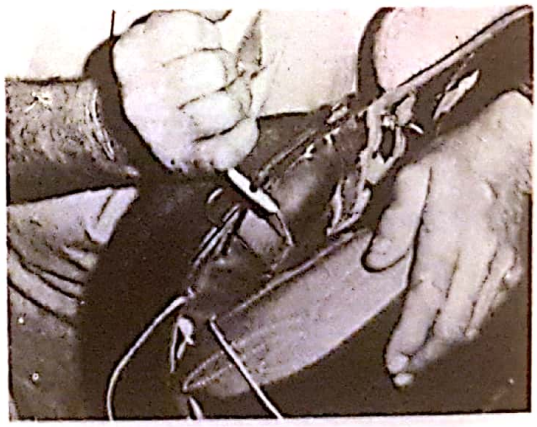
When a panel has been pulled into position by being first tacked and sewn in front and drawn up tight to the seat at the back, it will not be a good shape. The good shape comes with the awling and quilting given afterwards.



1

2

1. *FIXING FRONT*
2. *STITCHING TO FLAP*
3. *STITCHING PANEL INTO POSITION WITH HEAVY CORD*



3

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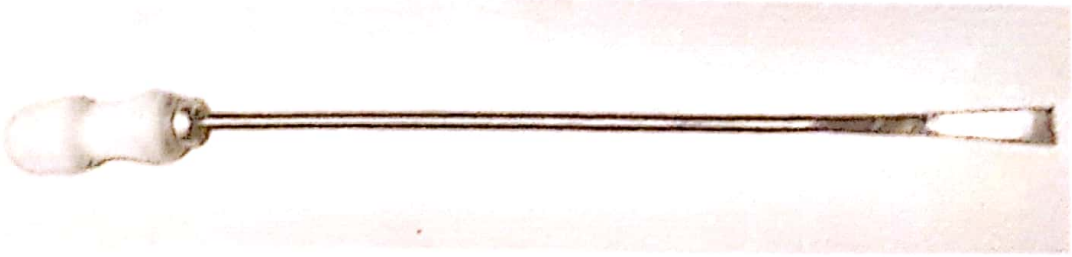


BELLY STUFFING IRON

HAIR FACE

To hair face the panel, cut a slit as shown.

Now with this tool shown above, proceed to face it with hair and to quilt it.

Now concerning the quilting. Use a quilting needle and push it into the panel with a strong thread attached.

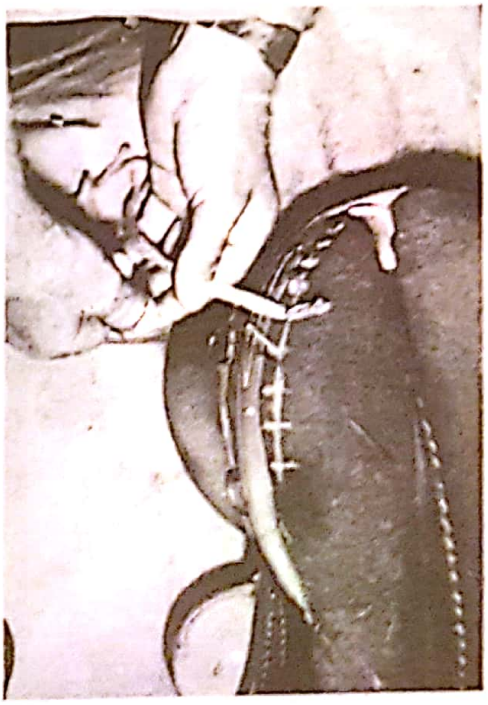
Gather a quantity of hair and come back through the same hole, putting a piece of coloured wool to hold the thread thus.

When the saddle has been quilted evenly all round the back the woollen ends are cut off.

Any queries on the saddle will be answered by the Author free of charge.

HAIRFACING

AWLING AND QUILTING



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HOW TO MAKE ELASTIC SIDE BOOTS

How many of our bush readers have sat under a mulga and wondered just how to go about making an elastic side boot?

It is almost a quarter of a century ago since my old friend, Dollar Mick and I did just that. We were wearing the shapely one-piece boot that was universal in those days, the Queensland standard. How that one piece of leather could be shaped to fit a foot was almost a miracle to us. We both liked playing with leather and we both needed boots. Times were bad.

All the equipment available at that time was a side or two of heavy kangaroo hide. For patterns we had plenty of rusty kerosene tins flattened out. There was a large heap of scrap tin before we got anything like a pattern.

I think of the many mates of those days who used to ride up and roll out the swag, eat with us, try themselves with the weights on a standing jump and all the capers that were so popular in the stock camps of those days... and laugh at our attempts to make those boots. Time went by; we almost had given the problem up when an old fellow (long since dead) said to us, why not shape the upper first and then flatten it out?

That was the key to the problem. We blocked a piece of kangaroo to the shape of the front of the foot on a wooden shape cut out of an end from a kerosene case, this shape. (See illustration No. 1).

CUTTING AND BLOCKING THE UPPER

Our first mistake here was trying to block the upper in one piece without first cutting out the holes for the elastic. It can't be done. Here is the shape of the piece of kangaroo hide with the holes roughly cut out for the elastic. (Fig. No. 2).

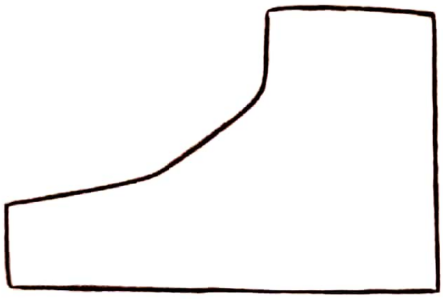

Fig. 1

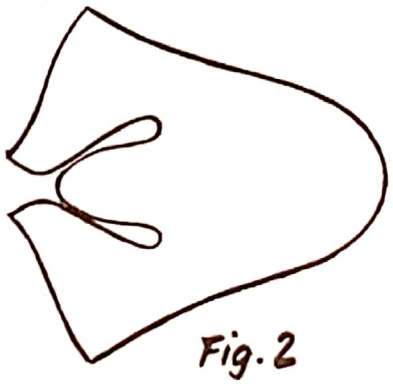

Fig. 2

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The kangaroo hide is well dampened overnight, and stretched on to the board as shaped in Figure 1. When it is stretched on it looks like this: (Figure 3).

The dots represent the tacks used in blocking. This can be a long, hard struggle to get the hide to lay down nicely on the wood all over but it must be done well if the finished boot is to look anything; and this is where a lot of makers take a short cut and make the boot in several pieces. (Fig. blocked boot, 4)

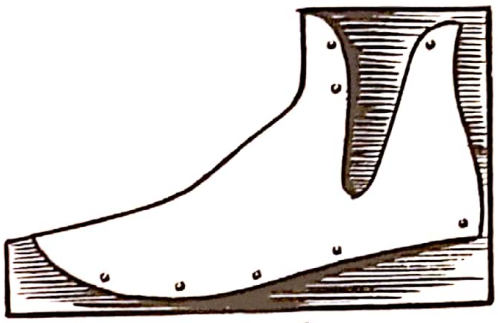


Fig. 3

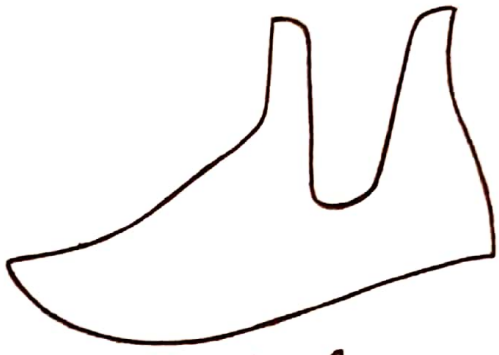
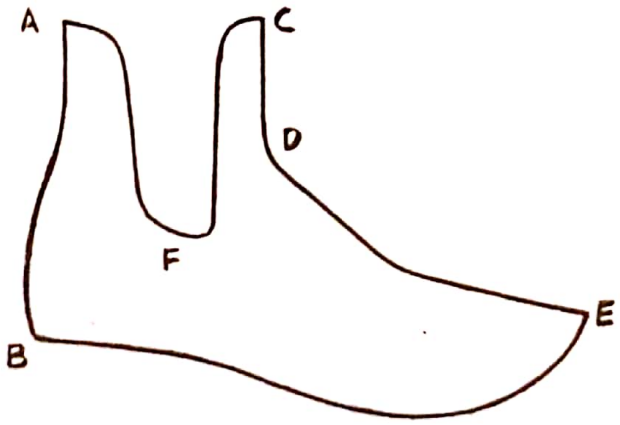


Fig. 4

The upper will take a few hours to dry; let it dry well. You will need a tin pattern to shape this upper and for easy cutting about 26 gauge iron will do. Now how to get you to make a tin pattern in one easy lesson. It took us years, but then we had no guide and made a lot of simple mistakes.

Get a pair of one-piece boots and measure carefully the various parts - for instance the width across the front, the depth from the front tug to the bend in the arch of the foot. Get the depth down the back from tug to heel and allow an inch for lasting. Perhaps if I give you the exact measures for a size seven boot, you can work on from there. Here is a rough sketch with all the measures. (See Figure 5).



C D = $3\frac{1}{2}$"
A B = 7"
C F = 5"
E B = 15"

Fig. 5

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MAKING THE UPPER

Now you are ready to make the upper. To do this there will be four back linings, two front linings, 4 tugs, 4 pieces of elastic. The back linings are the exact shape of the back of the boot less a quarter of an inch at the bottom of the back which is taken off to allow the stiffener to fit in without wrinkling the lining. (See Figures 6, 7 and 8).

Fig. 6

Fig. 7

Fig. 8

The elastic is marked to the shape of the tin pattern and half an inch all around. Now to fit up the upper ready for stitching. You will need some solution, and some small tingles.

Place the back lining on the back, letting it sit forward less than an eighth of an inch at the top, which will make it three-eighths at the bottom because, as you will remember, a quarter was allowed in the lining pattern for stiffener. This lining by the way can be good kangaroo hide. It is the best.

Now place the front lining into place. A spot of solution keeps the lining in place. Fit the front tug and hold it all there with a tingle through the tug, and a spot of solution.

The elastics are solutioned around front and back taking care not to get any solution on the part of elastic that shows. Fit the elastics into place while the solution is wet, and tack into place with as many tingles as necessary. Clinch the tingles very slightly, otherwise they will pull out and let the elastic slip about in the rough handling that they are bound to get while being hand sewn. (See Figure 9).

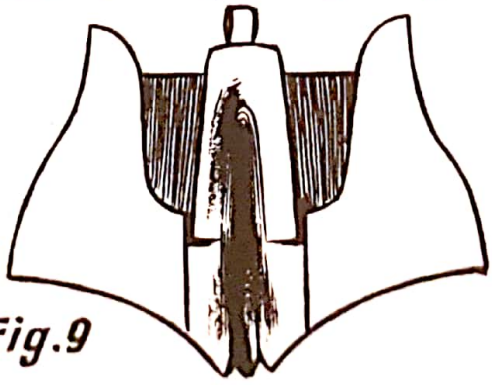

Fig.9

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Now to hand-sew the upper. You will need a small round awl - round, otherwise it would cut the elastic - 2 needles (No. 3 saddlers' are about right) some cotton the colour of the upper. Wax it well; Knox's thread is about the weight.

Start stitching about a quarter of an inch above elastic and keep going around the elastic over the front around the other side, and stop again about a quarter of an inch above the elastic. You will see directly why this place of starting and stopping is so important. One line of stitches well done is sufficient.

Sew down the upper close to the edge with the face side of the backs together. This secret of joining an upper is one that we learned after a lot of experiment, and if you read this carefully, will save a lot of mistakes. There is an easy way of closing an upper, but as I have said before our ambition was to produce the best and the neatest boot, and this difficult looking way is the only way that a really neat and smooth-wearing back can be done.

Rub the back seam that you have just sewn down on a piece of shaped wood or steel, and while it is still inside out, glue with rubber solution a strip of fine leather about half an inch wide, right down the back. Using a very fine awl, sew the strip to the upper each side of the back seam and as close as possible to it to make it neat. This you will find hard to do, but it can be done.

Now turn the upper so that the face sides of the back linings are together and sew down the linings close to the edge, rubbing the seam flat, thus. (See Figure 10).

Fig 10

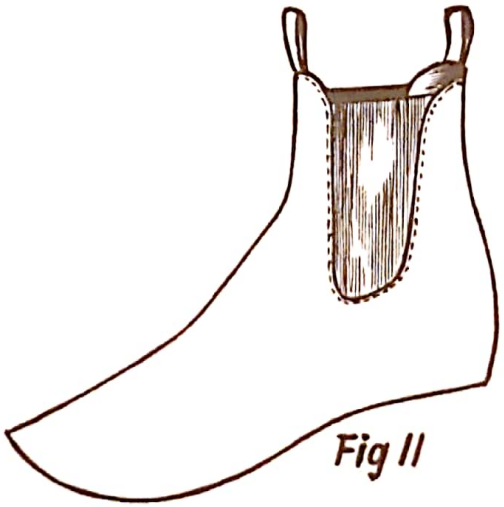

Fig 11

THE FINISHED UPPER

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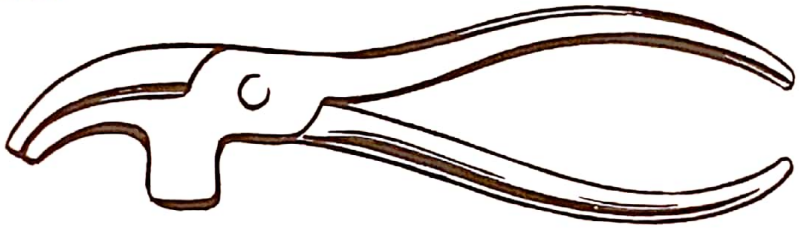
Now you will say, how can I straighten this upper out? Turn it back through the small hole left where the back tag has to go. This you will write and say is IMPOSSIBLE. It is not impossible and what is more, girls making uppers have to do it dozens of times a day, so have a go and you will get it after a bit of trying.

Now fit the back tug with solution and a tingle and sew from where you left off above the elastic across the tug and meet the other elastic. So you have the upper. (Fig. 11).

LASTING THE UPPER

Now you will need a last your size, and here you would be best to measure your foot and get a pair made to fit. Cost at the moment I do not know exactly, but it would not exceed £5. Cut an innersole of light butt leather and trim it carefully to fit the last. There are holes in the last to tack it on. Use tingles - they are easy to pull out and do not spoil the last. To last the boot properly, a lasting plier is necessary. It looks like this:



Tingles to last the boot are 5/16 fine. The stiffener for the back is this shape (Fig.I2). Cut it out of a piece of butt sole leather and skive the edges off very thin, all around. Dampen the stiffener well and glue with Davis Liquid glue. This glue is the only one I have yet found after twenty-five years of experimenting that will keep its shape, resist sweat and wet, be elastic, and hold the back up with spur and over-treading. The front stiffener is only a little one and is paper thin at the edge with just a little body in the centre. It is the shape shown below and is $4\frac{1}{2}$" long. (See Fig. 13).

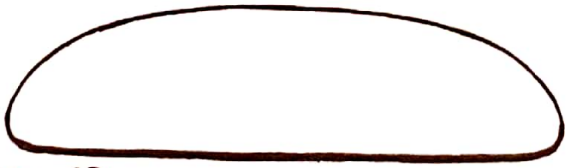


FIG. 12 BACK STIFFENER

FRONT STIFFENER

Fig 13

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This front stiffener is the most important factor in a good shape toe; a good shape last can be spoilt by a badly put on stiffener. Wrap it over the toe.

Glue top side only with liquid glue. Pull the toe over first, next joint of foot, then waist. Straighten the linings by pulling them up and feeling inside. Last nail the heel, just catching the edge of stiffener. Split the toe where necessary and tap it tight. A kangaroo upper is easy to last because it moulds to shape easily. I forgot to mention that the last needs a stand to hold it, and you will need an old iron last to knock the nails down on and to heel the boot.

SOLING, HEELING AND FINISHING

Cut the sole from the best butt sole obtainable. Why waste all that time and money by putting a poor sole on? Soak the sole over night and if it is too soft, then it is no good; but at any rate a wiser policy with all leather is to dampen between wet bags for a couple of days (I have always made it a policy that any leather that will not stand a day's soaking with me will not stand a wetting with the wearer, which is good sense). Nail on with brass tacks, never use iron. When the nail touches the steel of the wooden last, cut it off right close to the sole with a pair of nippers. These nails are knocked down later on the steel last, and clinched. The shorter they are cut the better rivet it will be and the smoother the innersole.

Now for the heel. The shape and size of heels is a matter of personal fancy. Several considerations govern it. The first is the length of the heel, next the angle of it, also the size of the top piece will be a governing factor in the finished shape. I will describe the building of a cuban heel, although this has a different interpretation by each maker.

Generally speaking the riding heel can be described as one that is high enough to stop the foot from going through the stirrup. Most old hands have seen a tragedy or near fatal accident occur through either the heel going through the stirrup, or the heel coming off on a colt.

To begin, shape the sole and beat it in until it fits the upper. This will leave a very rounded platform to start the heel. First rasp off as much roundness as possible, then tack a lift on - that is just the length you like the heel to finish. With a sharp knife, cut this platform flat. You should by now have almost a flat platform. Now for a secret that to my knowledge is not used by any factory maker. The heel will never run true with the sole unless a wedge is built into the

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heel. The wedge should be a lift and a half cut to nothing in the front. Use this as a guide and see if the heel finishes looking along the sole. If the heel does not run true with the sole the boot must always be broken backed and lose its shape.

The front of the heel needs to be about a rasp and a top piece high in front, using the ordinary boot repairer's rasp. Cut the top piece to the shape you fancy, nail it dead centre, put a line of nails around it, rasp it smooth, sandpaper it. Now rasp the sole close to the upper - not too close - wider at the joint than the toe. Paint the sole sides and heels with wax. paint and there she is.

Since I began this article the boys on the station have read the headlines. The comment: "You couldn't make me a pair could you?" Definitely not. I've only made a half a million samples.

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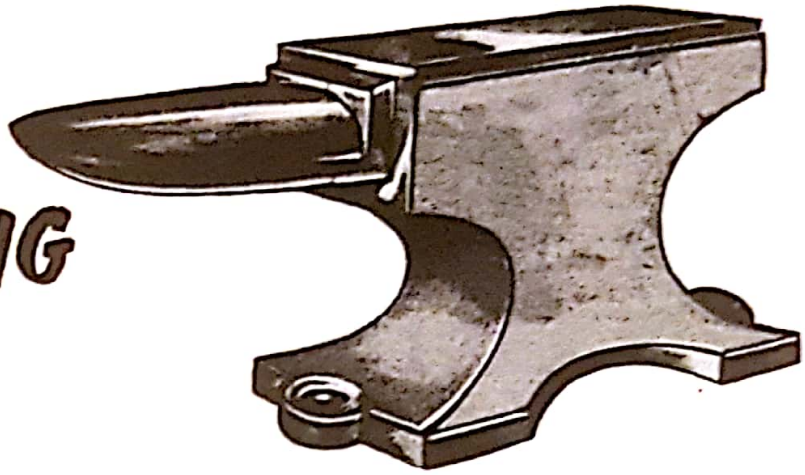
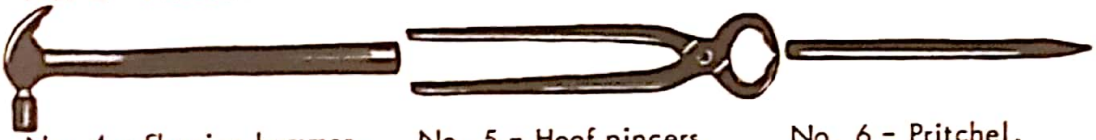
SHOEING TOOLS



No. 1 - Blacksmith's anvil.

No. 2 - Horseshoe nail - actual size.

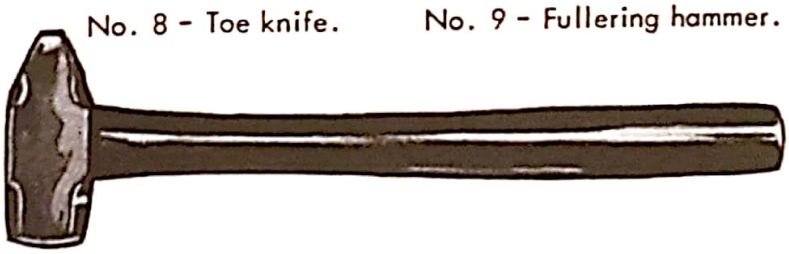
No. 3 - Farrier's rasp.



No. 4 - Shoeing hammer. No. 5 - Hoof pincers. No. 6 - Pritchel.

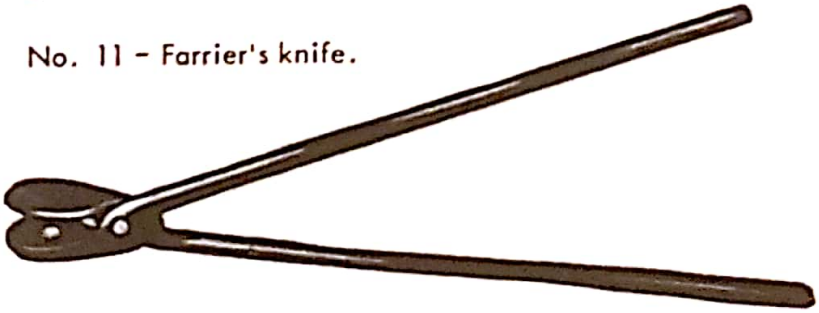
No. 7 - Hoof parer. No. 8 - Toe knife. No. 9 - Fullering hammer.

No. 10 - Buffer.

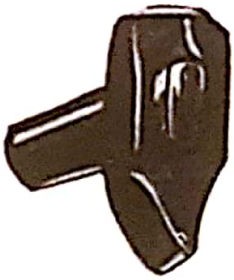


No. 12 - Blacksmith's hammer.

No. 11 - Farrier's knife.



No. 13 - Farrier's Tongs.



No. 14 - Fullering Hammer, showing shape of blade.

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The first thing to be considered is the necessary tools. Careful selection of these is important and will save a lot of trouble in all stages of shoeing.

TOOLS FOR SHOEING

THE ANVIL. I have seen substitutes made from a length of railway iron on a wooden stand, but a proper anvil, although expensive, is a necessary tool for horseshoe making.

Notice on the illustration page 133, the round neck for bending a horseshoe evenly and the square hole to insert a cutter or straight hardie for cutting hot steel. Sizes of these cutters range from 5/8" to $1\frac{1}{4}$" measured by the shank that fits the hole in the anvil. The anvil is most conveniently secured with spikes on a block of wood fifteen inches high, which is let into the ground.

FARRIERS TONGS. If you have ever tried to make do with a pair of pliers, you will know how necessary is a pair of tight holding tongs for handling the hot steel - in and out of the fire whilst pritchelling the shoe or bending it and again while fitting hot to the foot. The type with flat, small jaws is the most useful.

THE PRITCHEL. Or blacksmith's punch is used for making the nail holes. It is adviseable to buy the first pritchel as the size of nail holes is most important, but you can probably make your own when you get experience in tempering and handling the tools.

As with most tool steel the best temper for a pritchel can be got easily by heating to Red and standing the tip 1/8 inch in water and leaving the pritchel there to cool. If the water is too deep the pritchel can become hard too far up the point- only the tip needs to be hard and it is better for the pritchel to bend than break.

THE FULLER. Is used to make the nail channel - the top fuller illustrated will take a handle and can easily be held by yourself while using the blacksmith's hammer in the other hand.

BLACKSMITH'S HAMMER. When you get your hammer from the merchants it will almost certainly have either no handle or a badly fitted one. Fit the correct size handle carefully by rasping until the wood will just go into the hole, and then cut a saw cut two inches down the handle. Prepare a wedge by sawing a piece of old axe handle or dry hardwood 1/8 in. one

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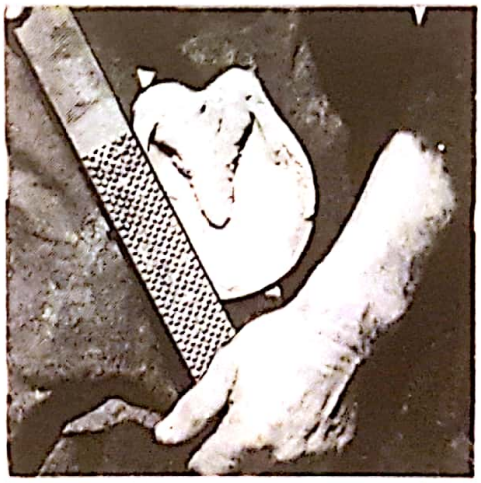
end to nothing the other and two inches long at least. Drive the handle in tight and glue the wedge before fixing - wedges should always be carefully sand-papered before glueing.
NAILS. Need to be bought in varying sizes to suit the size of the shoe but I find the one illustrated to be most suitable for all-round use.
FARRIERS RASPS. A medium or 16" is suitable.
PINCERS. Are almost standard, as are FARRIERS KNIVES and BUFFERS, but when buying your HOOF PARERS get a geared or lever action type - they are dearer but definitely worth it. Keep your parers razor sharp.

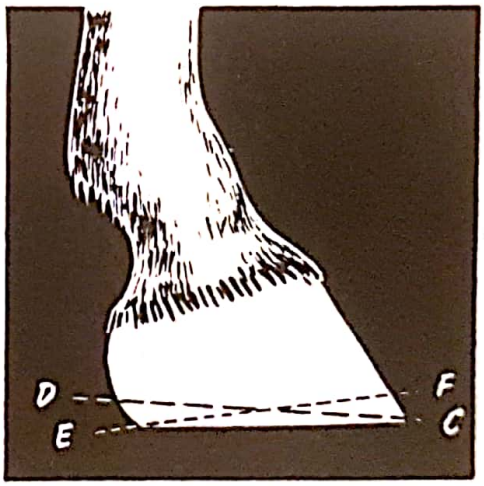
The only item not illustrated is the forge for heating the steel. This can be bought, and fitted with a bellows or air blower, or you can make your own.

PREPARATION OF THE HOOF

Remember that the hoof is prepared first and the shoe made after. Too many people buy shoes and slap them on the horse whether they fit or not.

Before picking up the horse's foot to prepare it for a shoe, stand back and estimate the angle at which you want the foot to meet the ground; this drawing will give you an idea of the correct angle.





LEFT: Trimming the foot. Preparing the sole for the shoe.

RIGHT: Original outline of hoof shown is correct. D to C indicates that too much has been removed from heel and E to F indicates that too much was taken off toe.

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If the foot has been worn too much in front or too much at the back, it should be corrected in shoeing. Often the foot has become spread out through walking in boggy country; this cannot be corrected quickly, but it can be corrected.

Some horses have a flat foot and some a concave, well hollowed out foot, with the heel coming well down below the frog and sole. This you cannot alter, as it is the breeding of the horse that dictates the style of hoof, but we will suppose that your horse is a normal-footed animal and that its foot shows a good quantity of healthy shell or wall.

The procedure is to pick up the front foot as shown here and to begin with the rasp to make a flat, smooth place for the shoe on the angle shown above as E to C front to back and square with the foot as regards side to side.

You will note first on picking up the foot that there is a horny development on each side of the back of the foot known as the HEEL.

This heel has to be rasped level with the wall of the foot and is perhaps the most difficult thing a newcomer has to do. The heel is often hard and very well developed and one is inclined to say, why spoil all that good foot and take away so much good walking material? This is part of the business of shoeing and must be done carefully. I am inclined to leave just a fraction of the heel, then spring the heel of the shoe slightly to accommodate the little I have left. My reason for so doing is that my horses are used in a long rotation and often lose their shoes in the bush before being used again, and I hesitate to make a horse so barefooted; but for show or other such purposes where a horse is kept shod all the time the foot can be rasped flat.

Generally speaking, when the wall is down to the sole (see illustration) and the white line is showing, it is well to make sure that you are not going too deep. In the case of the first shoeing, of course, the foot will be inclined to be high at the toe and the heel, and it is a long job to get the foot back to a flat surface; but for the sake of the fitting of the shoe, it is best to get contact all over the foot and when in doubt take some time over it.

It is never necessary to interfere with the frog for purposes of shoeing, except to trim a small piece that might overlap towards the heel, but this is seldom and unlikely... the frog is the cushion of the foot and remains intact....do not interfere with the sole more than necessary - it protects the soft flesh of the foot.

Front and back are different in shape, but the preparation

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is much the same as regards angle to the pastern and rasping the wall and heel.

When using parers for trimming, work from the inside of the foot out, with the blunt end of the parer fitting to the outside of the hoof, and leave some hoof for rasping - better to take too little than too much.

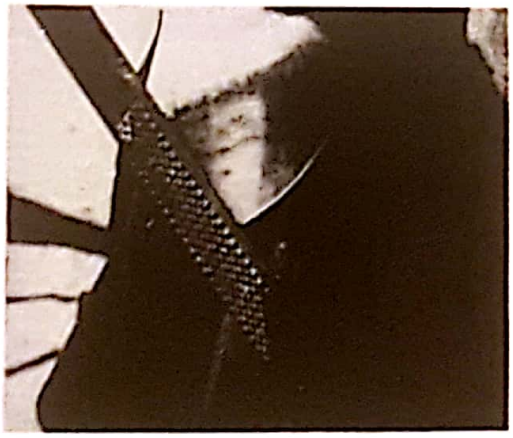
There are an infinite number of special types of feet and infirmities, irregular shapes etc.

One I will mention in passing because it seems to worry a lot of young riders, and that is the severely pigeon toed horse. My advice is to take no notice of it but to continue with the preparation of the foot as though it were normal; after all there is not a great deal one can do and with many horses it is natural and hereditary.

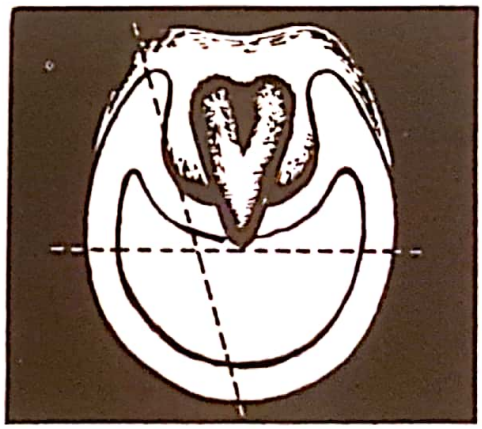
MAKING THE SHOE

The steel for a working shoe for station use or hacking in general is five-eighths wide and five-sixteenths thick. You can vary to 3/8" thick and use 5/8" wide steel if you want a heavier shoe.

After the horse's foot is prepared it is best to make a tin pattern of the outline of the foot showing on the pattern just how the shoe is to be. Measure as indicated in sketch and cut off lengths to match the four required.



Trimming the outside to required shape. Keep outside wall to its natural angle.



To get size for length of steel required, measure size of hoof as indicated, total both figures and add 1" for front shoe and $\frac{1}{2}$" shorter for hind.

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These are placed in the forge where a fire has been prepared with either coal, or wood, if no charcoal is about. (Coke is hard to handle). The steel is heated to red heat and care must be taken that it does not get to white heat when it burns. Take the bar in the tongs and shape it roughly over the round of the anvil keeping the tin pattern handy on the anvil to check as you go; if the steel is hot, it is only a matter of seconds to shape the shoe to the pattern. Place the shoe back in the fire and heat it while the others are being shaped. Now with the help of an assistant use the fullering tool and beat the fuller into the shoe (that is the Groove that takes the nails). Heat again and with a pritchel make six or seven holes in each shoe. For most purposes six will do. Get an old well-made shoe to gauge the holes. I suggest that the holes fit the nails reasonably...don't bury the head too far as it serves as a stud and soon wears flat. The reason why nails are not put too far back is that trouble is more likely and they serve no purpose except in the case of a bad sand crack in the toe when the clip is wide and nails are kept back.

CLIPPING

I favour clipping shoes and my reason is that the shoe stays forward where it is put and the horse that drops the front foot into the dirt as it comes forward is protected... also it locates the shoe as it is fitted. The spot for the clip is notched as and when you are ready to nail the shoe onto the foot, so do not worry if it is slightly out of centre but see that they are even for appearance. Cut the groove for the clip with a shoeing knife or rasp. Rasp the back of the shoe heel to make it smooth - this is best done hot. When the shoe is finished lay it out to cool; do not quench it with water as the steel twists, but if you must quench quickly dip the heels in first.

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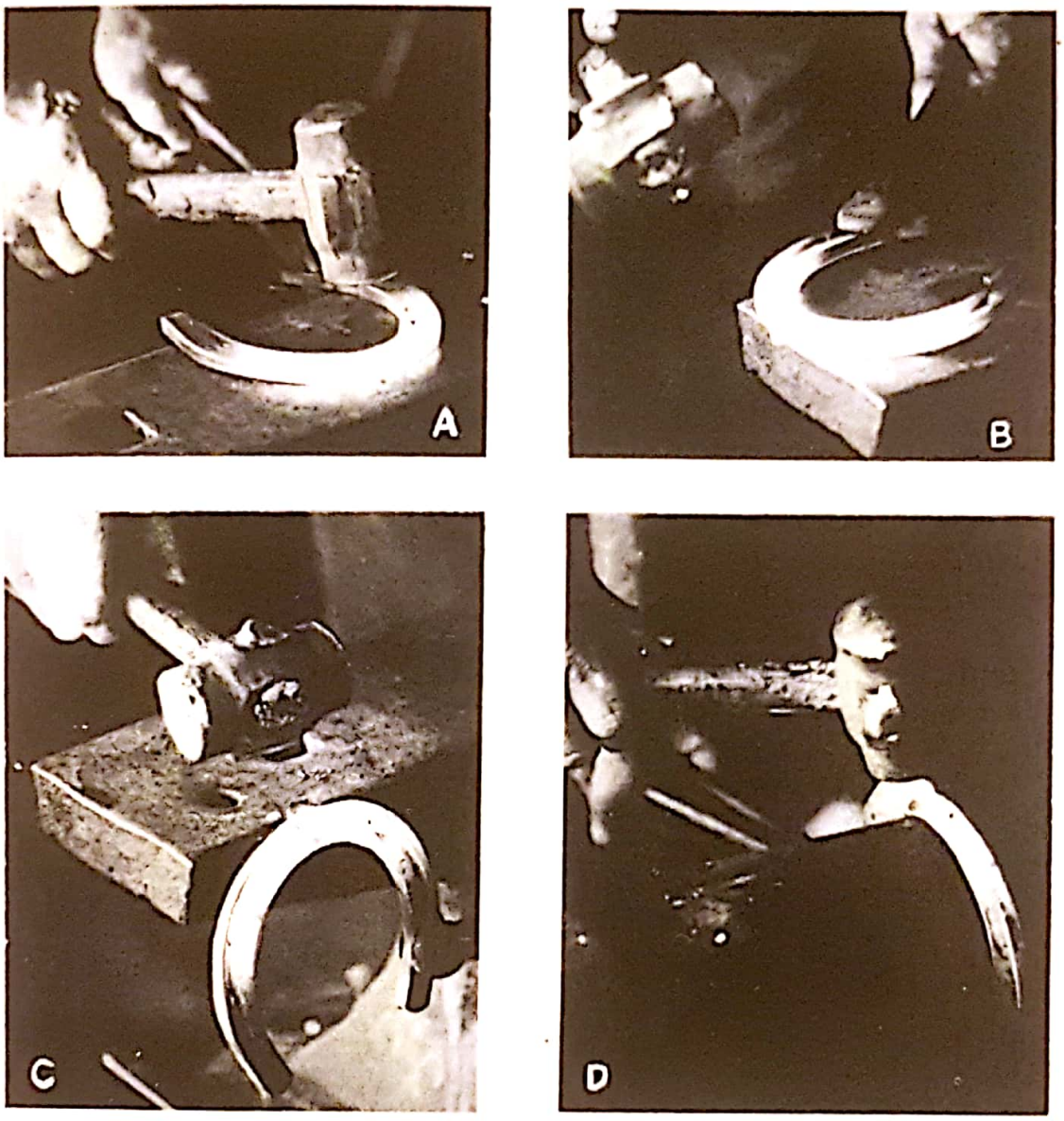

CONCAVING AND CLIPPING

A. Concaving inside edge to bring outside edge up ready for B. You'll note the face of hammer is rounded.
B. Shoe is then turned over and placed on heel of anvil with a small section over. Using the ball point on the side of hammer strike the shoe which is overlapping anvil. This will form a small thick boss.
C. Place as indicated in picture using bar on opposite side to point. You then draw the boss to a thin taper.
D. Hang the shoe on the beak horn in a position where the beak fits the inside formation of the shoe and using the flat face of the hammer, dress the clip down until it is flush with the outer edge of the shoe.

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NAILING ON THE SHOE

Photo shows the shoe being fitted to the front foot and the right way to hold the foot for this operation.

Knocking shoe down tight.

Clinching Nails

Make sure that the tip of the nail is slightly bent so that it will come out in the correct position.... trial will soon make you capable of judging this, but for a start, see that the nail does not go in too straight and thus go up into the foot instead of coming out of the hoof about an inch above the shoe. The nail must never come out more than one and a half inches above the shoe. If it is firm an inch above or a little less, this distance will be quite all right. Do not use nails that are too large as they will damage the hoof.

After each nail is driven into the shoe cut the sharp end off close to the hoof leaving just enough nail to clinch.

You will not have to cut off all these nails one at a time after becoming efficient, but it is wise to do so if the horse is restless so that you do not get ripped. It is because of the risk of being ripped with nails that an apron is so necessary. An apron split up the middle is the best (made of split leather). A pair of skimpy cut chaps is a good garment for shoeing.

When the nails are all in position and cut off, there is the clinching to do, and shown here is the position to hold the foot for clinching using the closed shoeing pincers and a hammer for the job.

It is a good practice to give the hoof a slight crease with

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the rasp directly below the nail before knocking it down; the shattered hoof stops the nail from lying too close. After clinching the nail, take the hoof in position and rasp the front and all round the shoe lightly to give it finish and take off the rough edges.

Shoe being fitted and nailed.

Cleaning up rough edges of hoof and shoe.

HIND SHOES

In picking up the hind foot take care to grasp the leg firmly and hold firmly at all times; not necessarily extended; but in the various positions necessary for the nailing, clinching and rasping.

Technique of shoeing the hind foot is the same as for the front as regards nailing, clinching and rasping.

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When picking up the hind feet stand well to the fore-hand.

Method of gripping hind foot.

DIFFICULT HORSES

The problem for the beginner is to know just how the feet must be handled, but I would suggest that the beginner (and the professional) can occasionally use straps profitably. Of course there is always the horse that needs the shoeing crush, but not many professional men would stoop to crushing a horse. Although in days gone by, when men had to shoe so many an hour for the big coaching firms, there were devious tricks employed. An old timer, now many years dead, gave me, among other things, a ring with swivel that he used to always keep mounted on a post close to the forge where he had boys work horses round and round so that they were slightly giddy when he got hold of them.

Now for the horse that will not give you his front foot. For this there is no substitute for the straps illustrated. These straps have to be strong enough that the boldest and biggest horses can be let loose without fear of them breaking the strap or buckle. I use double-tongue buckles now and find that red-hide doubled and carefully stitched will stand more than the stoutest leather of single thickness. The buckles are hand forged and the leather needs careful selection.

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Front leg strap

This front leg strap is also the first and most important piece of gear when you are getting about a young horse. Once you have the front leg strap in position and the head tied firmly to a post you should have no more trouble, as it is easy to shoe with the front leg strap on - not so easy to shoe the hind with straps.

Now for the hind leg strap. This strap is also some-what complicated and takes a fair amount of making; again it requires the very best of leather. Here is a photo of a horse with the strap in position. Note that the strap is padded where it contacts the horse's pastern. A good collar rope will do the job.

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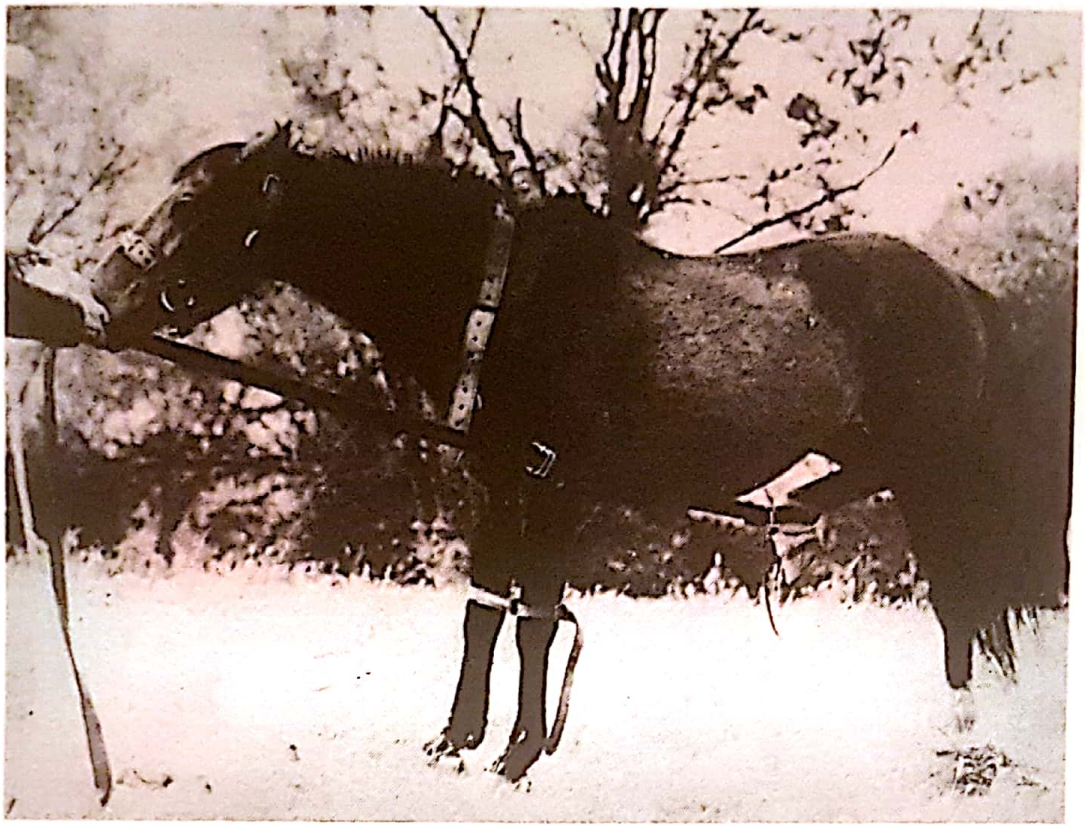
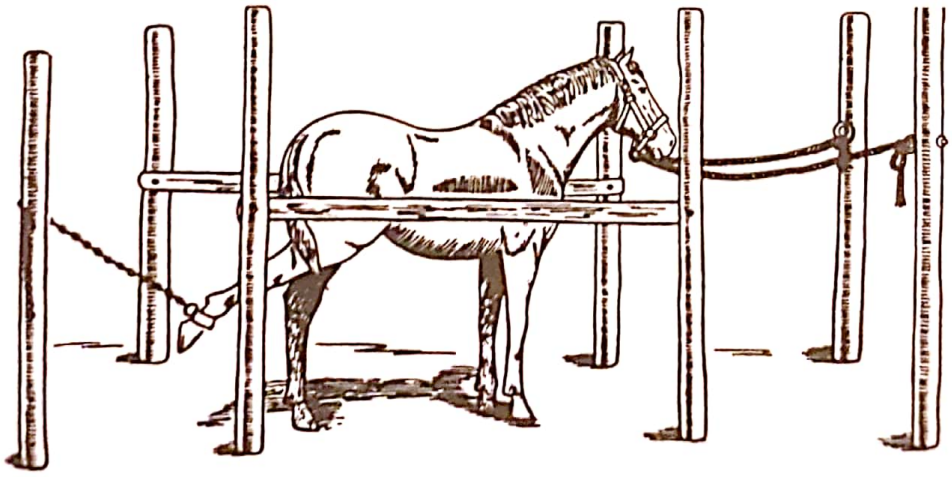


Hind leg strap

This means that you have to shoe upside down, as against the crush where the foot is up ready to tack the shoe on. As you will see, the crush is far and away better than the collar rope, so much easier, and so much more of an education for the horse. It sounds incredible, but a very difficult horse that needed to be crushed last shoeing was shod without ropes, straps or any gear at her second shoeing, and, surprising as it might seem, she held her foot up for inspection at a touch on the shoulder.



The Crush

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The collar rope or strap can be carried in a pack and is a very good friend at all times. If a horse is inclined to be touchy when mounted, it is no trouble to pull up the hind leg and do a few practice mounts. Also, if the buckle is added right at the top of the wither, one can get on and drop the strap by simply unbuckling the top strap, and this for the ringer who works with bad horses is a wonderful help.

This article about cleans up the shoeing information, without going into detail on the handling of sand cracks and deformed feet, but as that is a bit out of a bushman's field, I will conclude this with the advice that if you want to have good feet on your horses and you live in sandy or black soil where the feet spread and crack, never neglect to paint the hooves regularly with horse oil or a good substitute. Horse oil can be obtained from the big knackeries, and the substitute is beef fat with a small addition of stockholm tar.

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Leather Carving

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LEATHER CARVING

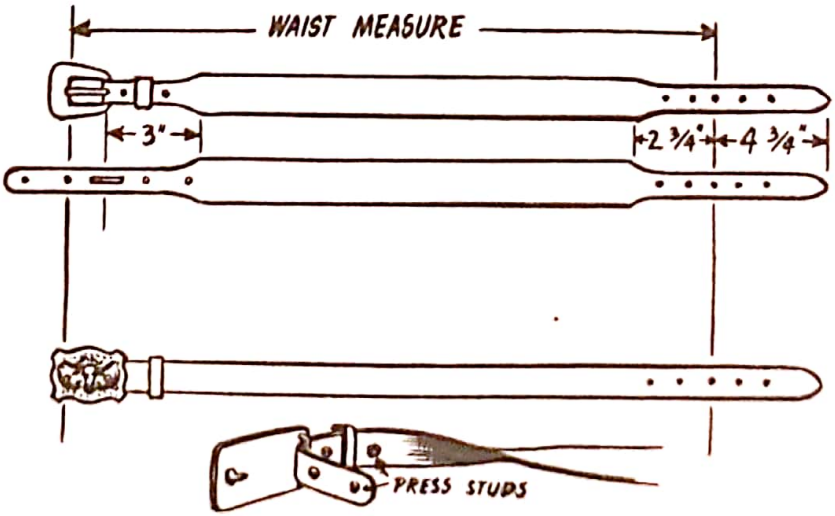
Specialised tools, templates and instruction books are readily available to anyone who wishes to try his hand at decorating his own gear or developing a profitable hobby.

I would like to stress the point that no special artistic ability is necessary to produce a wide variety of useful and ornamental articles; designs can easily be transferred to the leather with plastic templates or by using heavy tracing paper, and after a little practice on scrap leather, using the tools in the right sequence, you should be ready to produce semi professional work.

Some old timers still prefer their home-made tools and knives and excellent results can be obtained with improvised tools, but the sequence of carving is the same and the following step-by-step method of carving a belt is shown, using commercial carving tools for convenience.

Carving leather should be bark tanned and rather dry and firm with a tight grain or surface. Specially prepared carving leather is readily available in several different substances or weights. Do not attempt to carve chrome tanned or very greasy leather.

Cut out the required shape, in this case a strip the desired width of the belt, allowing extra length for the belt to pass through the buckle and also to turn back at the buckle end.



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Dampen the leather to make it suitably mellow for carving. The most desirable method is to wet the leather and leave it over-night, wrapped in paper or in a plastic bag. It should then be taken out and allowed to dry out until it almost returns to its natural colour. Once carving has been started the leather should not be allowed to dry out and can be moistened as necessary with a sponge.

Fig. 1. Mark the design on the leather using a template or tracing paper and ball point pen.

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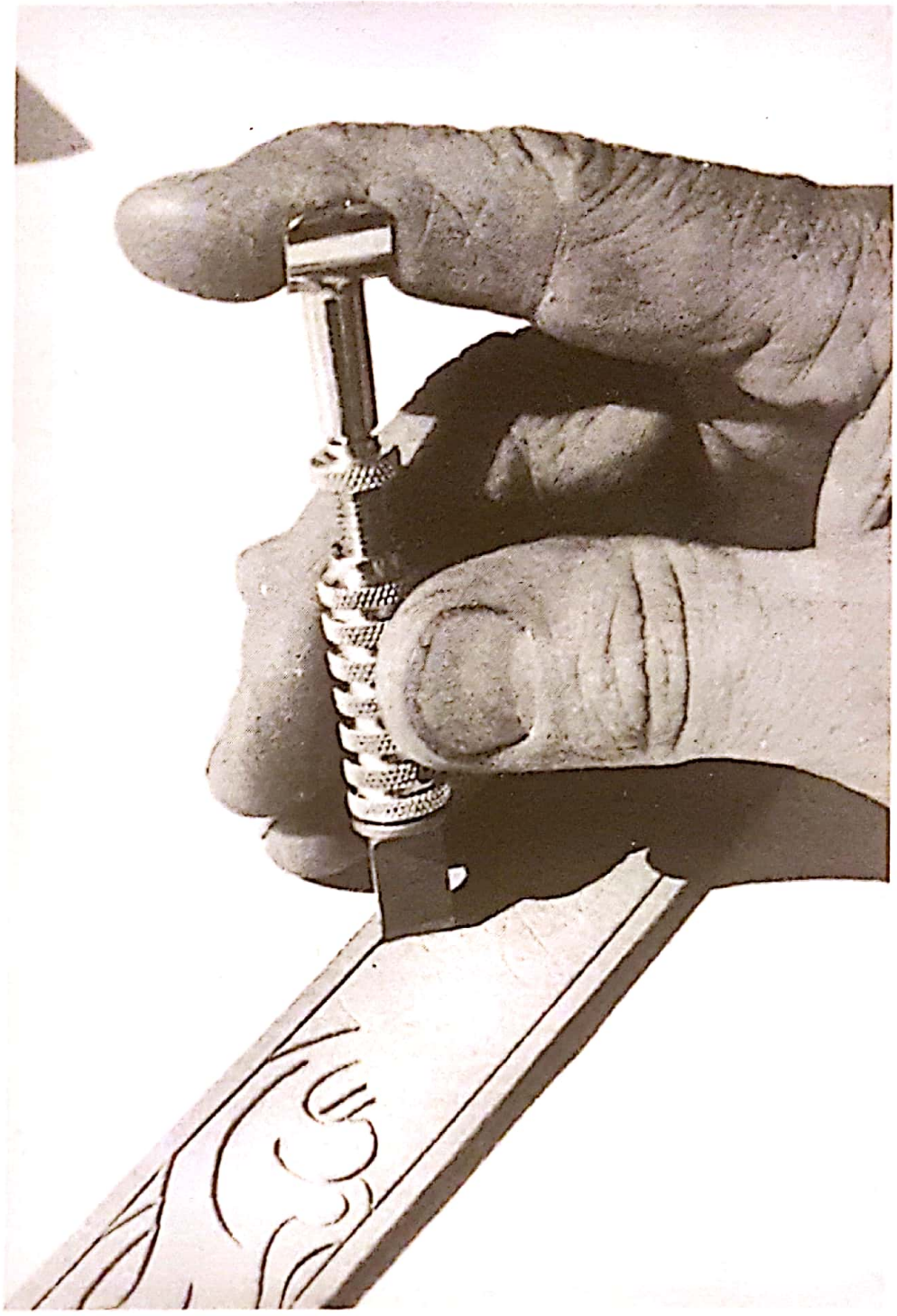

Fig. 2. With the swivel knife cut borders and main outlines. Where possible avoid intersections of cuts.

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FIG. 3. BEVEL BORDER EDGES

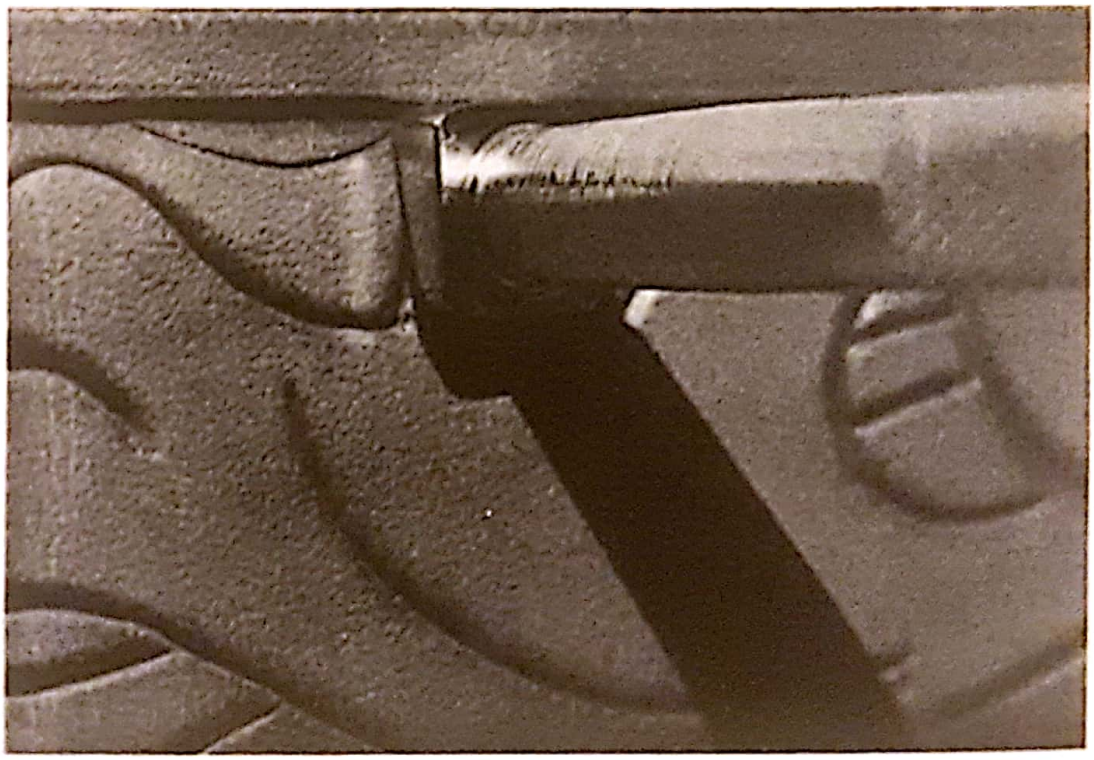

FIG. 4. BEVEL OUTLINES OF DESIGN

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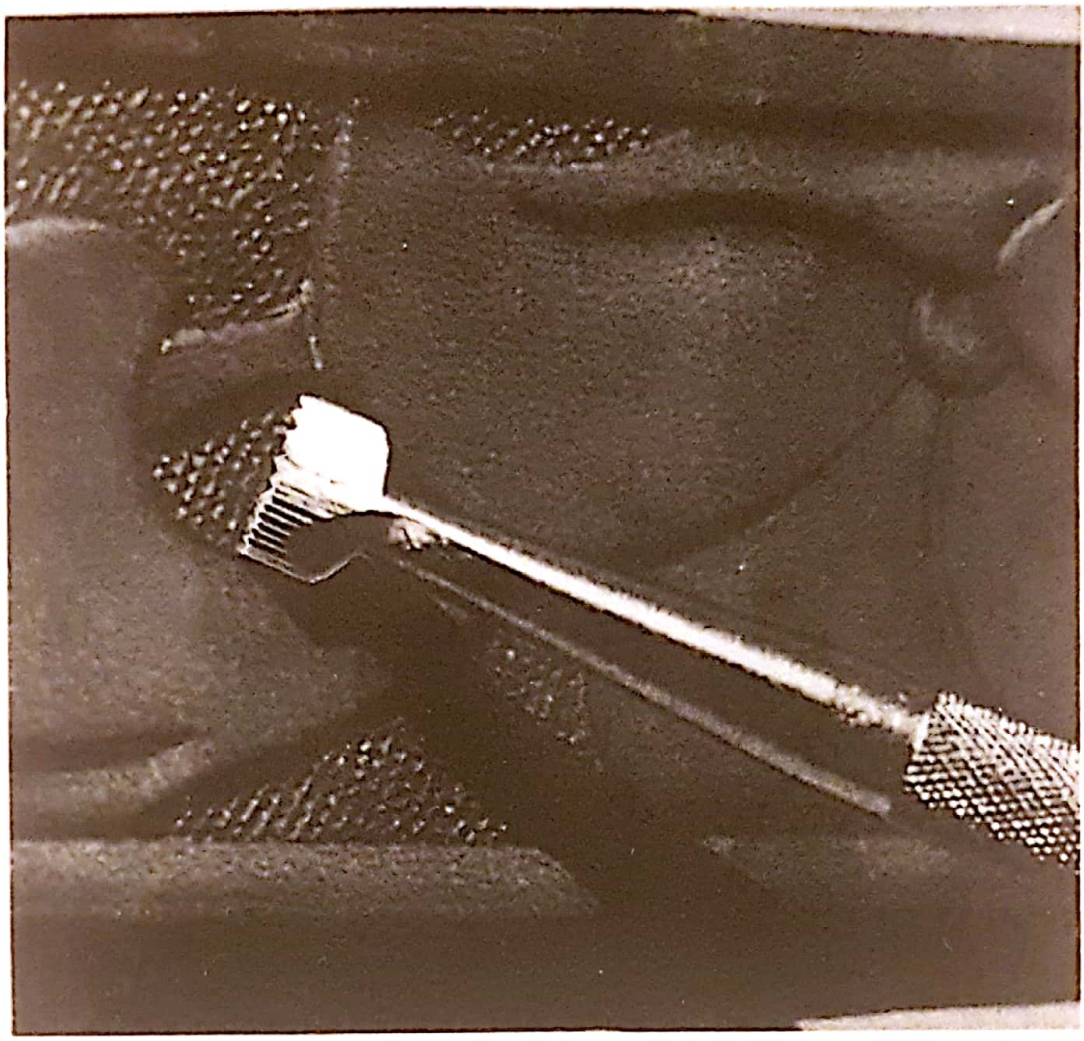

FIG. 5. BACKGROUNDING

Several tools can be used either to cover a large area with one hit or to get into narrow corners of the design. Backgrounding has the effect of lifting the main shapes and provides a matt surface for background dyeing.

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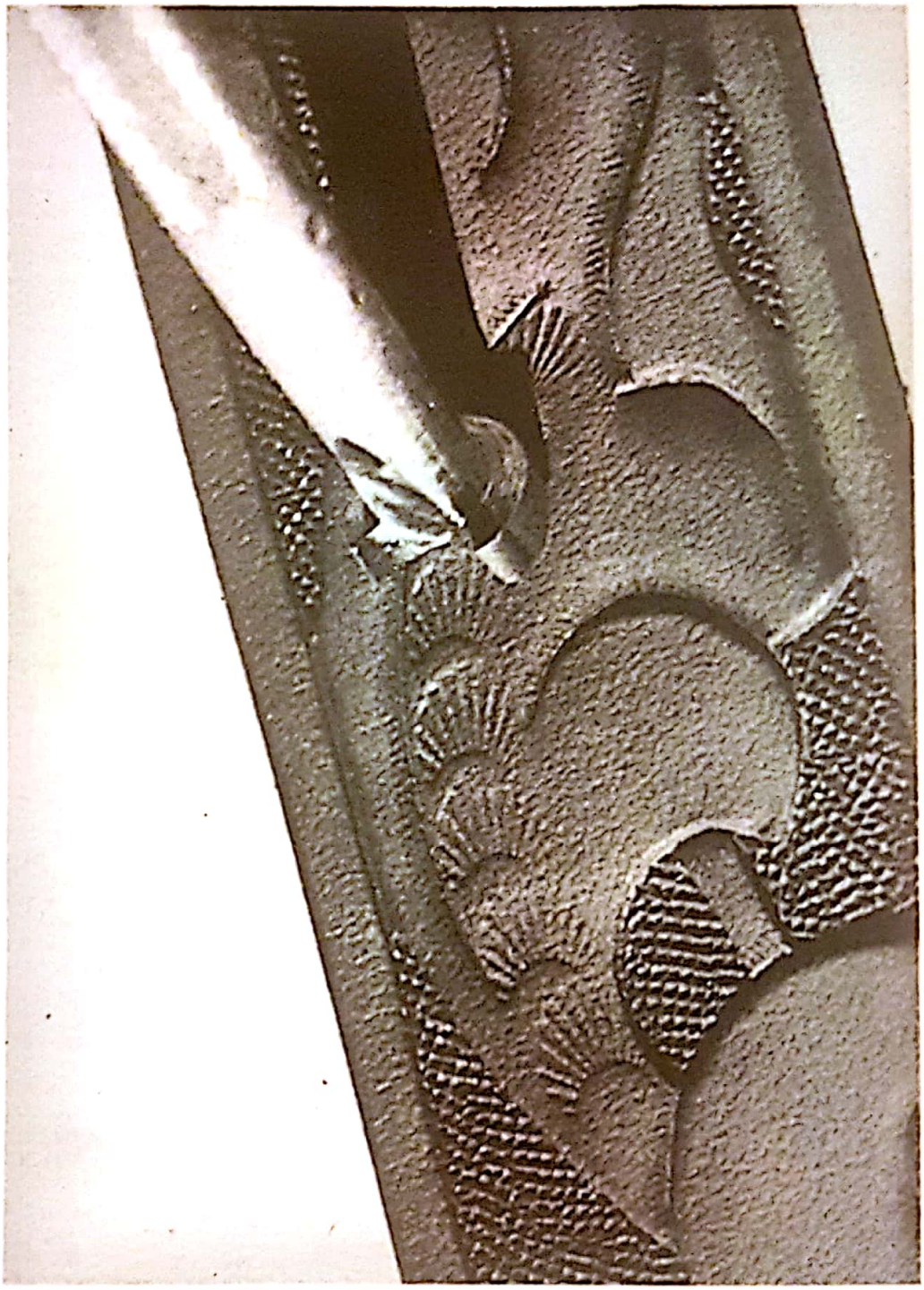

FIG. 6. USE OF VEINER AND CAMOUFLAGE

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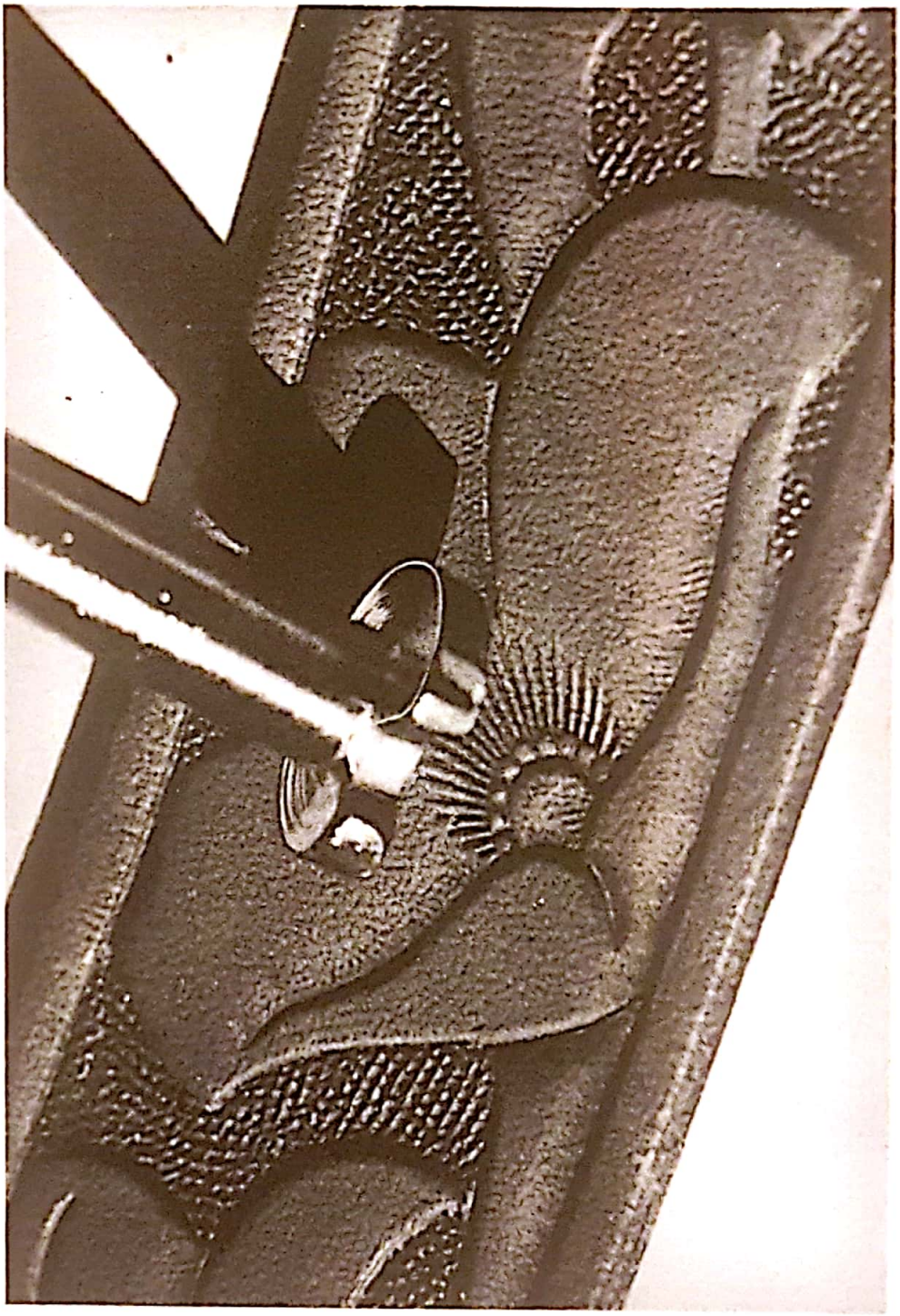

FIG. 7. FLOWER CENTER OR SUNBURST

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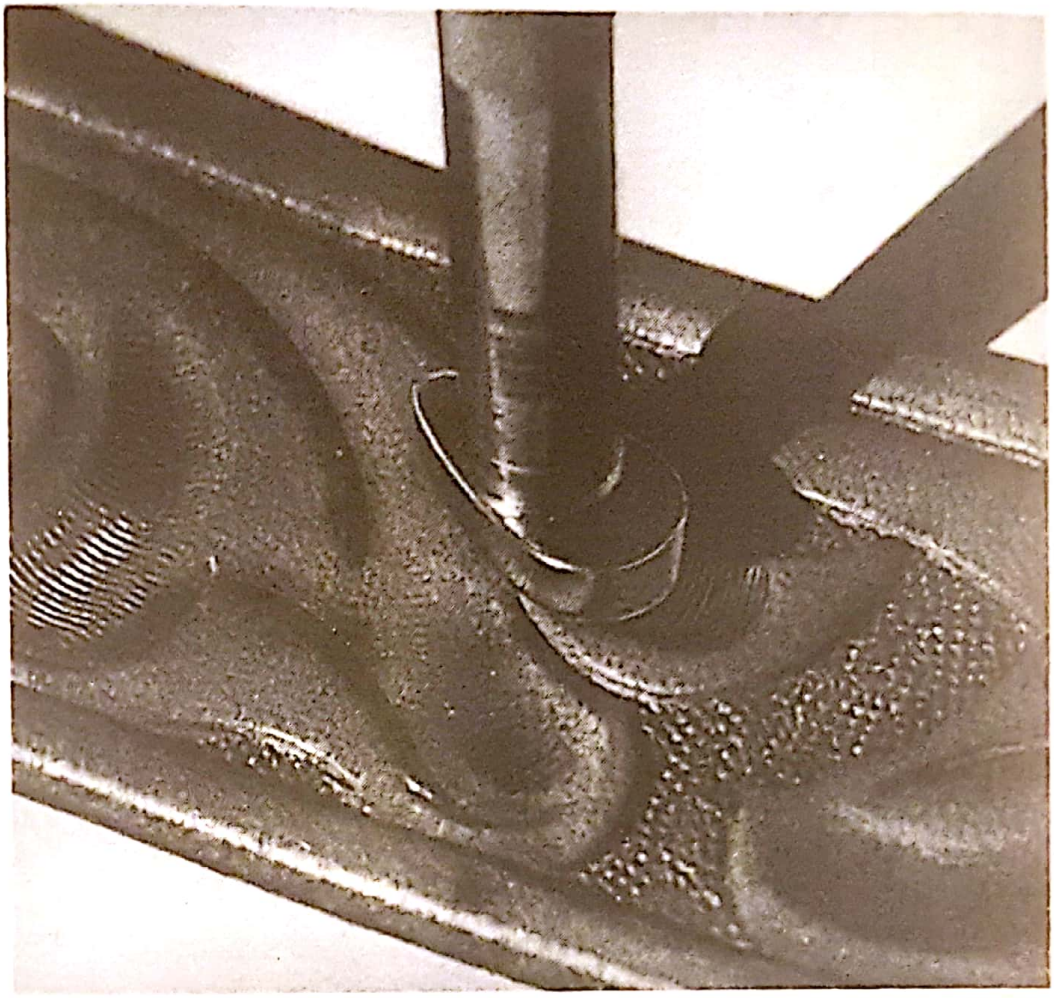

FIG. 8. SHADING, USING PEAR SHADER

FIG. 9. DECORATIVE FINISHING CUTS USING SWIVEL KNIFE.

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Fig. 10. Finished section of belt showing combined effect of tools.

To finish the edges, burnish with an edge slicker or rub with canvas or brown paper.

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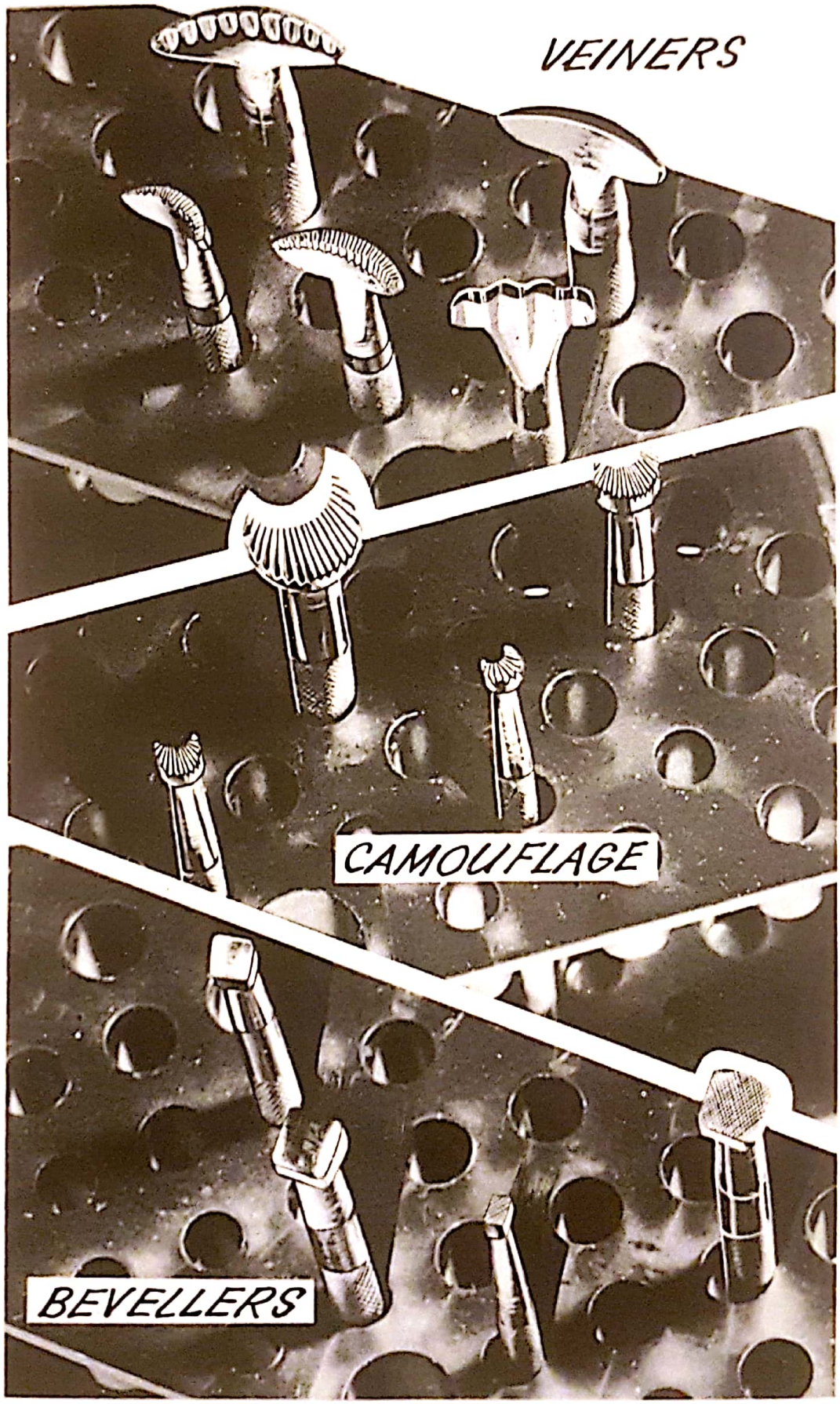

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ONE EAR BRIDLE

This is an excellent medium for leather carving, and a handsome bridle you will want to keep just for your favourite horse.

The drawing is self explanatory and construction very simple. Leather used is 4mm. embossing hide (a little less than 3/16"), or light to medium harness, and straps should be cut about 7/8" wide for best effect.

Cut out a paper pattern of the head and ear strap, using an old bridle as a guide for measurements, and try this shape on the horse for size before cutting it out of the leather.

Notice that one point is longer than the other to allow for distance across the top of the horse's head.

The cheek strap can be made simply, as in the drawing on the left, or if you prefer a noseband, detail is shown on the centre drawing. In this case a separate piece of leather is stitched on to hold the buckle and to form the loop for the noseband. If this stitching is carefully done, it will hold the noseband and the buckle firmly in place, and it is a good idea to insert a piece of leather scrap the same size as the noseband when stitching. To prevent the bar of the buckle coming into contact with the noseband, a thin piece of leather can be stitched in place between the buckle and the cheek strap.

The scroll pattern illustrated is easy to draw, and as the design repeats itself at short intervals, you only need to draw this short section on a paper pattern, and transfer it to the leather by moving the pattern along after each tracing. A little free hand work will be necessary around the ear piece.

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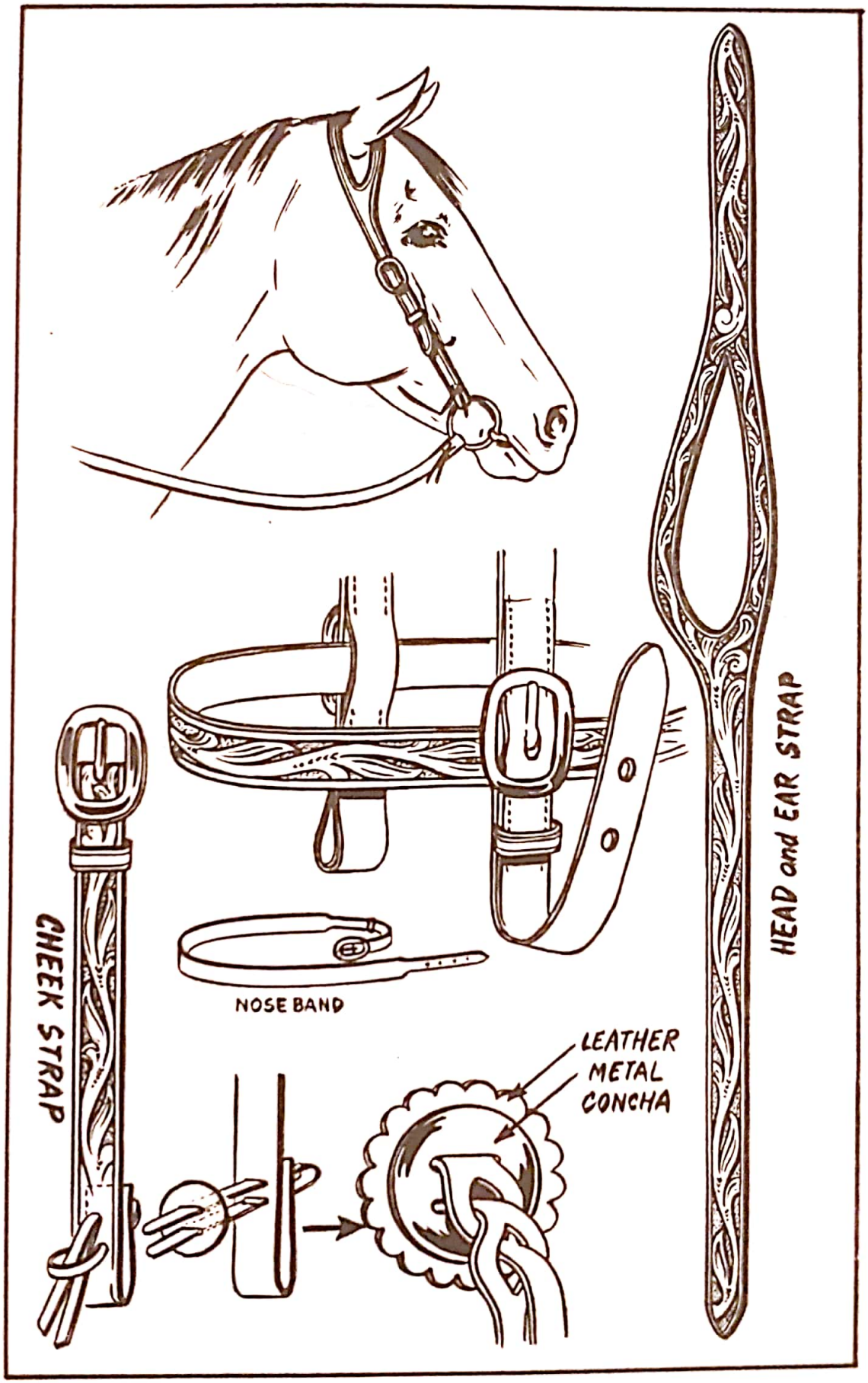

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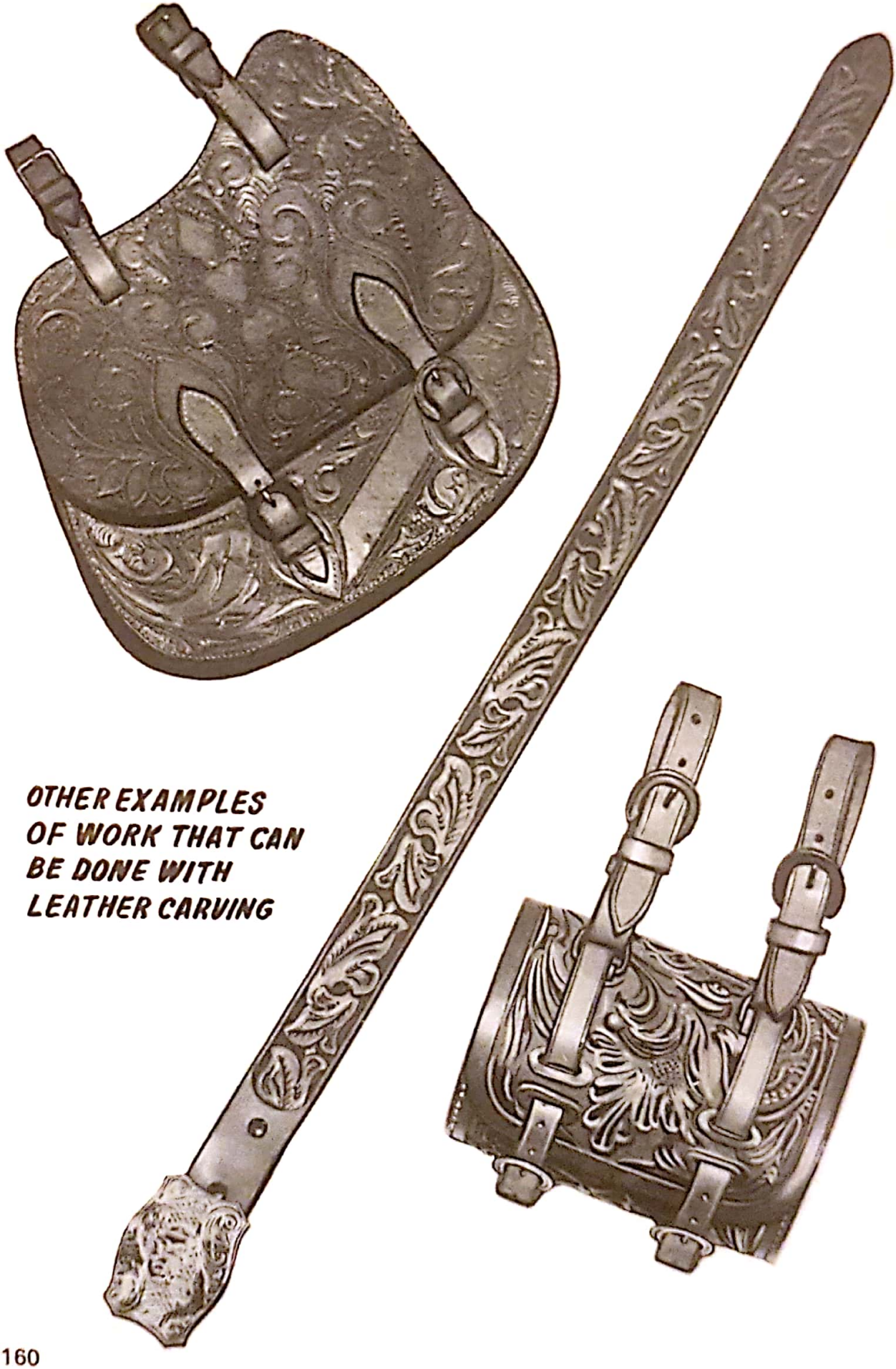

OTHER EXAMPLES OF WORK THAT CAN BE DONE WITH LEATHER CARVING

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HORSEHAIR HANDCRAFT

The art of working horsehair like leather strand plaiting was known and practised by the cowboys on the stations in the Far North. Bridle Reins, Quirts, occasionally a Hair Saddle Blanket, Hatbands and Belts were among the articles to be made.

There are four general types of horse hair construction:—

1. Twisted strand hairwork, in which the hair strands are made into rope. Size is controlled by adding strands.

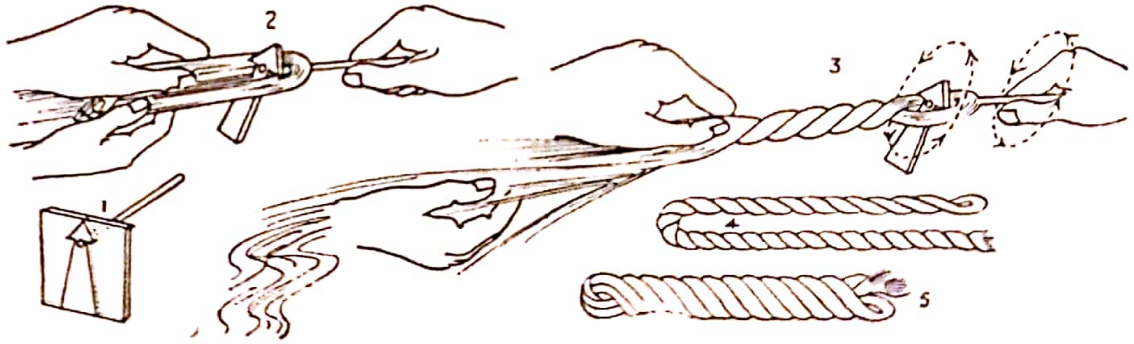
2. Plaited strand hairwork of four, eight, twelve and sixteen plaited strands are laid side by side and sewn together through the edges to form a flat strap.

3. Half-hitch hairwork is built around a core by throwing half-hitches with a strand of hair, around a piece of twine that is wound about the core as the work progresses. After the work is finished the core may be removed if desired and the hair tube flattened out.

4. Woven hairwork is produced by carrying strands of horsehair as a warp, and weaving with a two-strand weft. See Sketch 21, Fig. 11, page 93.

Twisted Hairwork

A simple and effective twisting tool is made out of a piece of wood as shown below. The arrow shaped board is placed upon a large spike, which passes through a hole near the arrow barb. The nail serves as a handle, also an axis for the board, which is caused to rotate as indicated in Sketch 3.



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A wisp of hair is placed over the arrow barb as shown in Sketch 2, and the arrow is rotated as shown in Sketch 3. The operation of the twister backs away from the person who holds the twisting strand and feeds the hair into the strand as needed.

The length of the single twisted strand will be four times the length of the finished rope. The single strand is doubled as shown in Sketch 4, and the strands will coil together into a double strand rope. The rope is doubled again as shown in Sketch 5. Terminal Turks Head knots may be tied on the right hand end. The left hand end of the strand, Sketch 5, does not require a terminal knot unless the strands are cut, since the strands double back upon themselves and are held tightly in place by the tendency to twist together.

Plaited Strand Hairwork

Horsehair strands to be plaited should be prepared from hair of uniform length. Five to ten horsehairs are placed side by side, and an overhand knot is tied at one end. A slight twist, about three turns, will make the hair into a strand. Then tie an overhand knot at the other end.

Plaited strands of horsehair in multiples of four will yield a finished strand that has a square cross section. Several strands when placed side by side and stitched together will give a flat strap.

See Fig. 7, Sketch 16; Fig. 8, Sketch 9; Fig. 9, Sketches 5, 8, 12. Many and varied are the designs produced by using black and white (grey) horsehair or other contrasting colours in the plait strand. The colour and arrangement of the hair strands determines the pattern in the plaited strand. These strands may then be used to parallel other strands in such a position that the combined pattern results in the design element of the finished work.

See Fig. 7, Sketch 16; also Fig. 8, Fig. 9, and Fig. 10.

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Eight Plait

The method of plaiting eight strands of hair is shown in Fig. 7, Sketches 1 to 7. For convenience in starting the plait, the strands are separated into two groups of four each and supported as indicated in Sketch 1.

Cross the two left hand strands over the two right hand ones as shown in Sketch 2. The highest thong on the left is brought around behind the strand, under the two right-hand strands, and over two as indicated in Sketch 2, and in place in Sketch 3. Change hands and repeat the operation from right to left, as shown in Sketches 4 and 5. The principle then for eight plait is as follows: Bring highest strand around behind the plait, under two and over two. Change hands and repeat, using the highest strand on the opposite side of the plait.

Eight Plait Designs

In Fig. 7, Sketches 10, 12, 14, three patterns are presented which appear in a strand of eight plait when following the strand arrangement shown in Sketches 9, 11, 13.

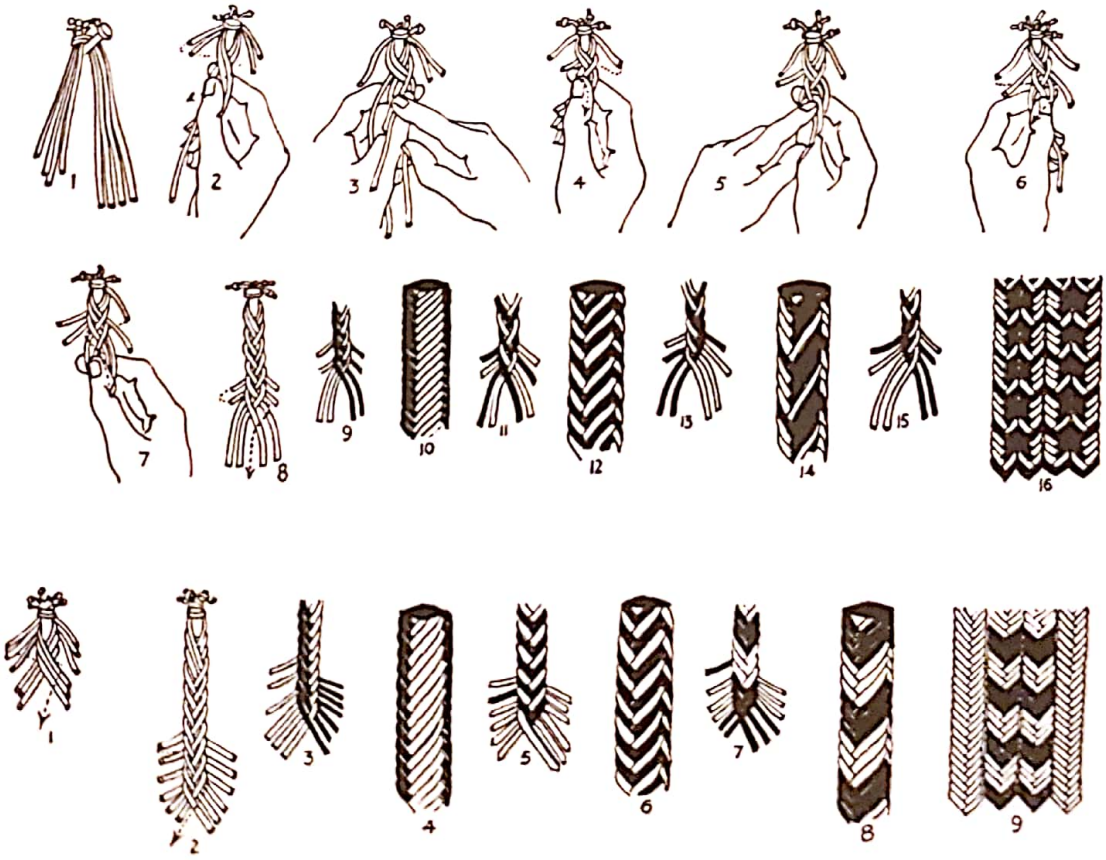

Fig. 8

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Twelve Plait

The procedure in plaiting twelve strands is similar to that described for eight strands. The start is made by crossing the three left hand strands over the three right hand strands, Fig. 18, Sketch 1. The principle for twelve plait follows: Bring the highest strand around behind the plait, under three and over three. Change hands and repeat, using the highest strand on the opposite side of the plait.

Sixteen Plait

The sixteen plait is produced in a similar manner to the eight and twelve plait. Start the plait by crossing four left hand strands over the four right hand strands, Fig. 9, Sketch 1. The principle for plaiting sixteen strands follows: Bring the highest strand around behind the plait under four and over four. Change hands and repeat, using the highest strand on the opposite side of the plait.

Sixteen Plait Designs

In Fig. 9, Sketches 4, 7, 11, three patterns are presented which appear in a strand of sixteen plait when following the arrangements shown in Sketches 3, 6, 9. Sketch 10 shows the same pattern as that appearing in Sketch 9, only reversed. In the assembly of plaited strands, Sketches 8, 12, and 13, the left and right hand patterns combine to produce a design in the assembled strap.

Fig. 9.

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Strap Assembly

In Fig. 10, Sketches 1, 2, 5, and 6, will be found a method commonly used in the assembly of a strap from plaited strands. Sketches 1 and 2 show the method of making the round end of a strap when it is to be used for a belt tongue. In using an equal number of plaited strands the first strand is folded back along itself as shown in Sketch 1. The next strand is laid alongside of the first strand and passes around the end and back on the opposite side of the doubled strand. Other strands may be added to increase the width in the same manner.

In case the desired width of an assembled strap requires an odd number of plaited strands, the arrangement shown in Sketch 2 is frequently used.

The parallel plaited strands which make up the strap are held in place by a thread shown in Fig. 10, Sketch 5. This thread is sewn through all strands, with stitches the length of which are about equal to the width of a single plaited strand from which the strap is made. The end of the strap shown in Sketch 5 is made rigid by seizing each strand separately with thread, about two turns each, and then seizing all strands with a few turns of thread just back of the seizing threads on the separate strands.

Fig 10.

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Sliding Knot and Tassel Construction

Adjustable fastenings for Horsehair Hatbands, Lanyards, and other articles, are similar in construction to those used on leather. Single or double plaited strands may be terminated in a tassel as indicated in Sketches 1 to 18, Fig. 11. The end of the plaited strands are seized with thread as shown in Sketches 2 and 3. A Hair Tassel of short lengths (5 in. to 6 in.) of hair are placed around the ends of the strands as shown in Sketch 4. The seizing thread is carried around the tassel hair as shown in Sketch 5. The upper ends of the tassel hair are folded back over the seizing thread as shown in Sketch 6, and these are seized in place as shown in Sketch 7. The needle is now threaded with a strand of horsehair, and the end is secured as shown in Sketches 8 and 9. Two turns of horsehair are half-hitched on each side of the seizing thread as shown by the Sketches 10, 11, and 12. These bands of horsehair are used in forming the covering which conceals the ends of the tassel. Two styles of tassel end coverings are shown in Sketches 15 and 18. The former is made as indicated in Sketches 13 and 14. This type of covering is well adapted to tassels of small dimensions, and for best appearance the length should be equal to the diameter of the covered tassel.

The tassel covering shown in Sketch 18 is built up of several rows of half-hitches, woven as shown in Sketch 17, also in the larger detail, Sketches 19 and 20. The half-hitch covering in Sketch 20 is terminated by securing the upper seizing strand with the last row of half-hitch work. In Sketch 19 no seizing strand is used and the last row of half-hitch work completes the covering.

Woven Horsehair

Woven strands of horsehair are made up as shown in Sketch 21, Fig. 11. The ten warp strands are divided equally, and the two weft strands are passed through the warp strands from opposite directions, the warp is reversed and the operation is repeated. The weaving is ended as shown in Fig. 10, Sketch 6, and the half-hitch covering is applied to conceal the ends of the warp strands.

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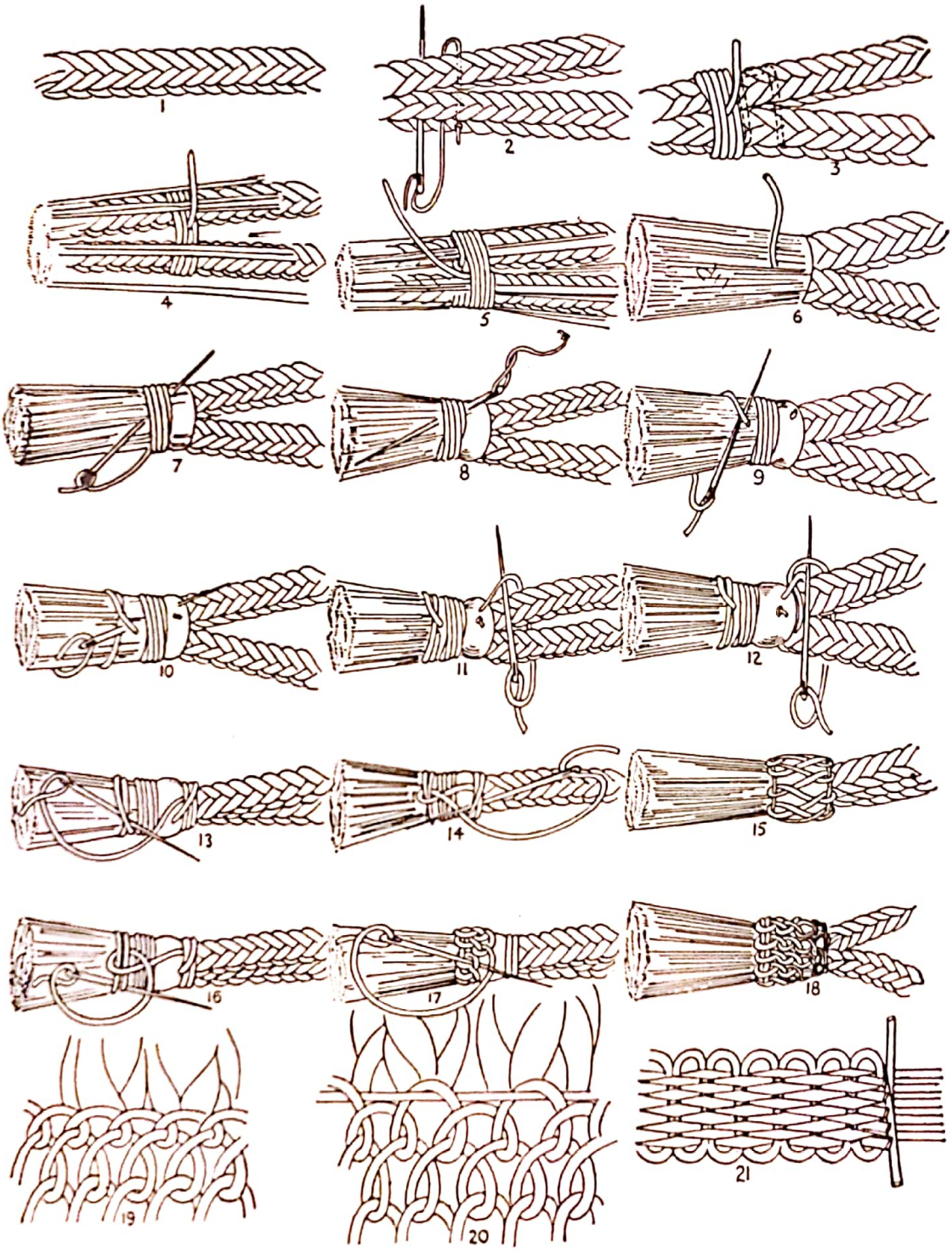

Fig. 11.

Half-Hitch Work

Horsehair workers who make tubular belts and insets for leather belts employ a technique known as half-hitch work. Two types of hitches, a front hitch and a back hitch, are used by these craftsmen.

The fabric is constructed upon a foundation cord, usually a double cord, which is wound upon a mandrel or core made of wood.

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A suitable support and tension control device is suggested by Sketch 1, Fig. 12. Two balls of twine (collar twine is commonly used) are shown. From the centres of each ball the cord is fed under tension through the double hook support to the wooden mandrel or dowel rod. This rod should be slightly tapered, ranging from 5-8 in. diameter (left end) to 9-16 in. This slight taper facilitates the removal of the hair work from the rod. The two cords are attached to the dowel rod, a suitable method is suggested by Sketches 2 and 3, Fig. 12.

Horse hair strands made from 25 in to 28 in. length hair (8 to 10 hairs each) are attached to the foundation cords by the device known as a larks head, shown in Sketch 4, Fig. 12. See illustration for construction of larks head, Fig. 12.

The ends are purposely kept unequal in length, to facilitate splicing in additional hair at intervals. This practice avoids more than one joint at any point which effectively conceals all splices. Narrow horsehair insets for leather belts and wrist bands, etc., are made in pairs on the mandrel. Later they are separated by cutting the foundation cord between the two pieces of fabric. See Sketch M, Fig. 15.

Half-Hitching Procedure

Hold the wooden mandrel in the left hand as indicated in Sketch 5. The chair, tension hook and mandrel, arrangement shown in Sketch 1, is recommended. Tension is placed on the foundation cords by pulling on the mandrel with the left hand.

The strand of horsehair, Sketch 5, shown at the lower edge of the mandrel is carried around the foundation cords and under itself. This method of looping strands of horsehair forms a front hitch mentioned above.

Refer to Sketch 6, which indicates the mechanical structure of this element, the front hitch, and note that the free end of the strand is carried around the foundation cord and under itself. Sketch 7 shows the same element portrayed by diagram. This semi-perspective drawing has been used to visualise the technique of design building which appears in Sketches 12 to 21, Fig. 14.

Sketch 8 shows the structure of the back hitch. It is to be noted that the free end of the strand is carried around the foundation cord and over itself.

The principle of half-hitching may be stated as follows:—

1. The free end of the strand (see Sketches 6 and 7) emerges below or in front of the loop, around the foundation cord in the front hitch.

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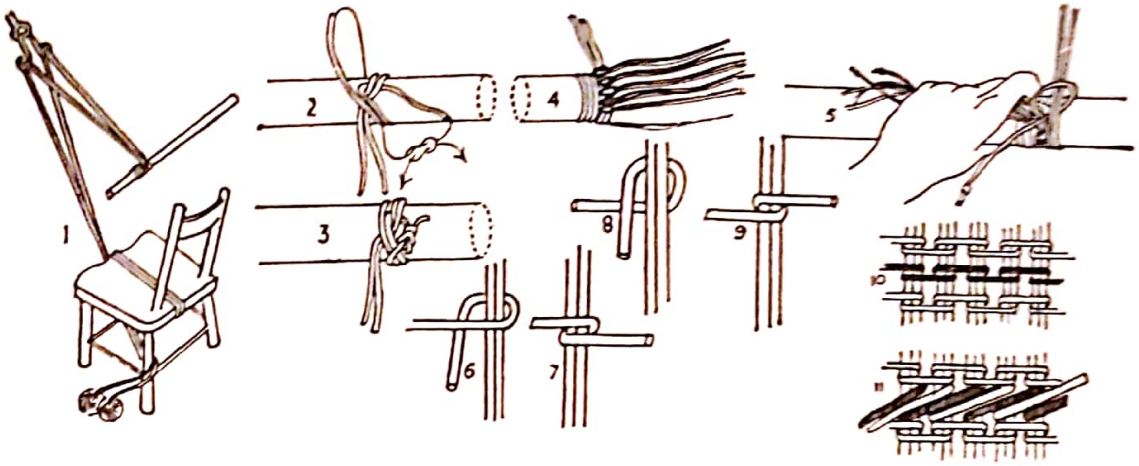

Fig. 12

2. The free end of the strand, see Sketches 8 and 9, emerges above or back of the loop, around the foundation cord in the back hitch.

It is suggested that the beginner learn the half stitch technique, by making a border or selvage pattern — at first and later follow the construction of a design element as detailed in the series of diagrammatic drawings 12 to 21, Fig. 14.

This preliminary study may be made with string in case horsehair is not available. Two or more colours are desirable to give contrast to the different elements in the structure.

BORDER OR SELVAGE CONSTRUCTION

Parallel Stripe Pattern

Refer to diagram 10, Fig. 12, which shows the structural detail for a simple border pattern. Three strands, one black and two white, are indicated in the sketch. The upper and lower rows of loops or hitches are indicated in white and the centre row is indicated in black. The letters A to E, Fig. 13, represent the two cord foundations about which each strand is hitched. It must be remembered that the foundation cord is wrapped on the wooden mandrel (see Sketch 1, Fig. 12) one turn at a time.

The free ends of the strands are held in the left hand, which also grasps the mandrel as indicated in Sketch 5. Hitch each strand as follows:—

1. Take the lower strand and make a front hitch around foundation cord A, Sketch 10, Fig. 12.

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2. Take the centre strand and make a front hitch around foundation cord A, Sketch 10, Fig. 12.

3. Take the upper strand and make a front hitch around the foundation cord A, Sketch 10, Fig. 12.

4. Rotate the mandrel one turn to bring foundation cord B into position, which is on the right of cord A.

5. Again make half hitches around this foundation cord with each strand in turn beginning with the lowest, this time using the back hitch, see Sketches 8 and 9.

6. Rotate the mandrel one more turn to bring the foundation cord C into position for hitching.

7. Again make half-hitches around this foundation cord with each strand in turn beginning with the lowest, using the front hitch, see Sketches 6 and 7.

Repeat.

Diagonal Pattern

Refer to diagram 11, Fig. 12, which shows the structural detail of the diagonal border pattern.

Four strands, one black and three white, are indicated in the sketch. The upper and lower rows of half-hitches are alternate front and back hitches formed as described above. The two centre strands, one each white and black, which form the diagonal portion of the design are both made with front hitches as follows:—

1. Front hitch the white strand around the foundation A.

2. Press the black strand into the space between the free end and the loop of the white strand on top of Cord A and front hitch it over Cord B.

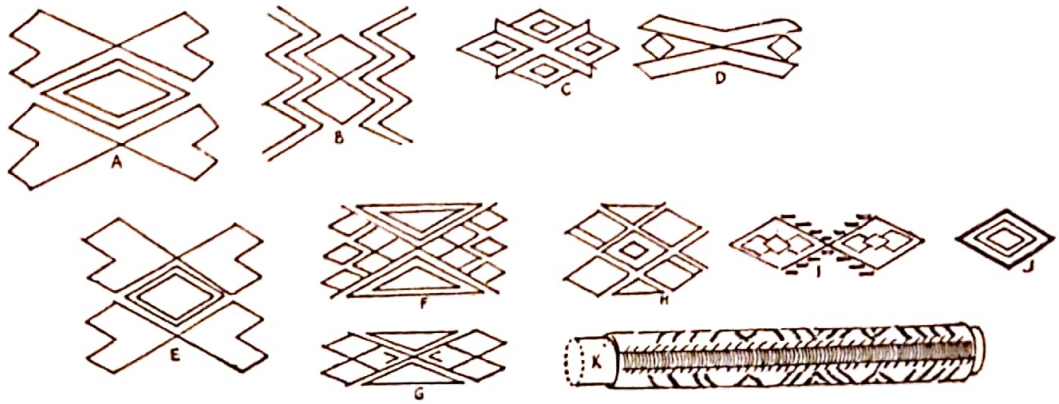

Fig. 13

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3. Carry the free end of the white strand emerging from below the black strand, over Cords A and B, Sketch 11, and front hitch it around Cord C. Note the free end of the black strand is emerging between Cord A and B, and below the white strand.

4. Carry the free end of the black strand, over Cords B and C, and front hitch it around Cord D. Note the free end of the white strand is emerging between Cords B and C, and below the black strand.

Repeat.

DESIGN BUILDING

Experience in making border designs which require the use of both principles of half-hitching should make clear the procedure in the development and construction of designs.

The design outlines shown in Sketches A to J, Fig. 13, have been selected from several pieces of hair work which may be considered representative exhibits of this type of craftwork. Two elements only are employed in the construction of any of these outlines, the straight line and the diagonal line. This restricts the choice of patterns to those of diamond or triangular shaped areas.

Straight line design elements are produced as described above for making a plain border. The line made by half-hitching a strand of

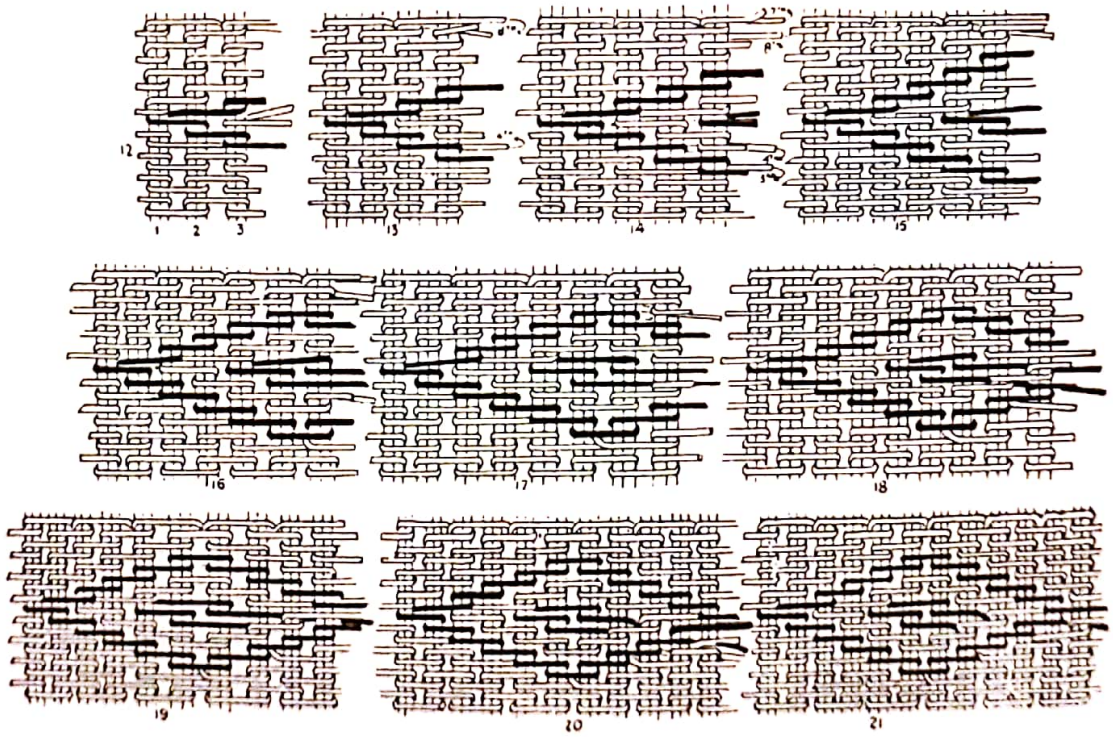

Fig. 14

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horsehair around foundation cords, alternatively using the front and back hitches is straight, paralleling the axis of the mandrel. The width of this line is twice the thickness or diameter of the horsehair strand. Diagonal line design elements are produced by half-hitching a strand of horsehair, repeatedly using the same kind of hitch for the desired length of line. Front hitches used consecutively produce a diagonal line which rotates toward the worker, and when continued for the length of the mandrel becomes a spiral, rotating counter clockwise. Similarly, back hitches used consecutively produce a diagonal line which rotates back or away from the worker, and when continued for the length of the mandrel becomes a spiral rotating clockwise.

The use of the diagonal line with appropriate changes in direction, and contrasting colours applied to enclosed areas constitute the technique of design making.

The series of diagrams, 12 to 21, portray the technique used in building a diamond-shaped design element. The vertical parallel lines represent the foundation cord which are wound on the mandrel as the half-hitch work progresses. The horizontal lines represent the strands of horsehair and the hitching procedure is indicated for each strand at each foundation cord. The symbolism shown in Sketches 7 to 9, Fig. 12, for indicating the technique of front and back hitching has been used in these diagrams. The interpretation of the specifications indicated in diagram 12 follows:—

Nine strands of horsehair are shown in diagram 12, eight of which are white and one black. Four of the white strands appear below the black strand and four above. Those below the black strand are front hitched around the foundation cord No. 1. Those above the black strand are back hitched around the foundation cord No. 2. The black strand is not hitched around the foundation cord, it is merely slipped over it and both ends extend to the right. After the next foundation cord is wrapped on the mandrel, the procedure indicated by the diagram is the following:—

Starting at the bottom of the diagram back hitch three of the white strands around foundation cord No. 2. The fourth white strand is not half-hitched around the foundation cord, instead it is carried over the foundation cord and the free end is covered by the foundation cord No. 3 when it is wrapped on the mandrel. It is necessary from time to time to drop out a strand which forms the background area in this manner, to accommodate the strand forming the design. Referring again to diagram 12 the specification indicates that the black strand

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passing over the foundation cord No. 1 is to be front hitched around foundation cord No. 2. Also the other end of this black strand is carried over the foundation cord No. 2.

Again the diagram 12 indicates that the next three white strands are back hitched around foundation cord No. 2. The fourth and last white strand is not hitched around, but merely carried over the foundation cord No. 2 and is also dropped out by being carried below the foundation cord when wrapped on the mandrel. It will be noticed that the fourth and eighth white strands have been carried under the foundation cord No. 3. This technique is known as dropping out a strand. Also note that these dropped out strands have been replaced. At the middle point below the two black strands the replacement takes place. The white strand is not hitched around the foundation cord No. 3. It is merely slipped over it as indicated in the diagram, both ends extend to the right.

The hitching specifications for foundation cord No. 3 as given in the diagram 12 follows:—

The lower white strands—first, second and third—are to be front hitched around foundation cord No. 3. The fourth white strand is not hitched but is carried under foundation cord No. 3. This strand is being dropped out to make room for the lower black strand which is to be front hitched around the foundation cord No. 3. The upper black strand is to be back hitched around foundation cord No. 3. Also the rest of the white strands are to be back hitched around foundation cord No. 3.

It should be noted that this procedure has started the diamond pattern, which is developed step by step in the succeeding diagrams. The diamond pattern reaches the maximum width or spread in diagram 15. In order to develop this pattern it has been necessary to drop out two more white strands. This process is indicated in diagram 14, and the four strands thus dropped out, or carried below the foundation cords are the third, fourth, seventh and eighth. Also in diagram 14 the space left vacant by dropping out a pair of white strands is occupied by the addition of a black strand in the centre of the black diamond. These strands which have been dropped by carrying them under the foundation cords, are picked up as needed to fill the spaces created by the black strands as they converge to the point of the diamond design. The points where these white strands emerge or are picked up. will become evident from an inspection of the work. This series of diagrams show the hitching specification at each point in the development of a typical design used in hair work.

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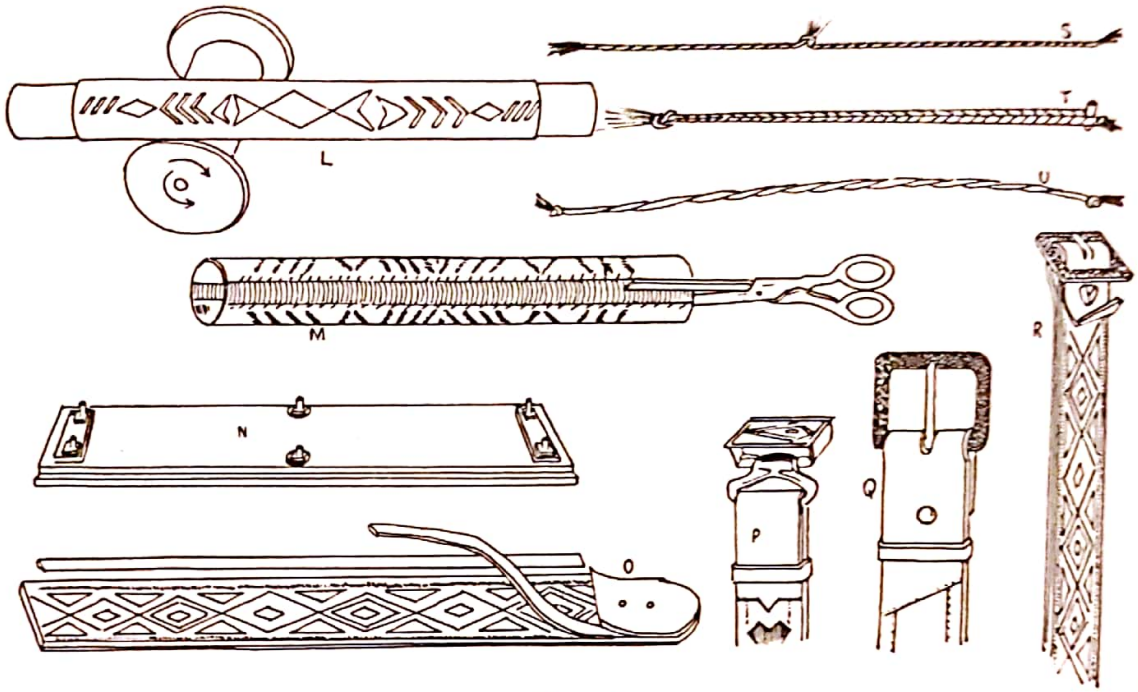

Fig. 15.

REMOVE HAIRWORK FROM MANDREL

A wooden mandrel shown in Sketch K, Fig. 13, has been covered with a piece of half-hitched hairwork. This must be made soft and flexible with water. Either immerse the mandrel in water or pour water over it. Roll the mandrel across a wooden spool, see Sketch L, moving it back and forth, under pressure. Gradually rotate the mandrel to insure all parts of the hairwork coming in contact with the spool which smoothes out irregularities and compresses the hair loops together.

Dry the hairwork, and remove it from the mandrel, which is slightly tapered to facilitate this operation. Sketch M shows a tube of horse-hair work, consisting of two half-hitched sections separated by a space of undercovered foundation cords. Cut these cords to separate the two hair strips.

The strips of horsehair are again soaked in water until soft and pliable. Then place them between two hardwood boards and apply pressure with clamps or bolts. Sketch N indicates a press made of wood held together by bolts and nuts. Tighten the clamps while the hair is drying to maintain pressure on the strip for the hair shrinks as it dries. Remove the dry strip and trim off the loose hair on the back, also the ends of the foundation cords to a uniform length of about 3-16 in.

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MOUNTING HORSEHAIR STRIPS

The mounting of pressed horsehair strips is almost entirely a leather working procedure. The strip is attached to a piece of leather with flexible cement. The flesh side of the leather (usually Kip, 2½ to 3 ounce weight) is coated with cement which is permitted to dry partially. A second coat of cement is applied and the hair strip pressed into the cement in its proper position. Sketch O shows a belt in the process of construction. The hair strip is shown attached to the lower piece of leather. Two narrow pieces of leather wide enough to cover the foundation cord fringe which extends some 3-16 in. beyond the hair strip and overhang the edge of bottom piece, are cemented in place, Sketch O.

The edges of these cover strips should be skived thin where they overlap the foundation cord fringe to make a neat joint along the side of the hair strip. Cement top cover pieces to each end of the belt with the ends skived or thinned down to fit neatly over the end of the hair strip.

Sew the cemented pieces to the base.

The edge of the belt should be trimmed, creased, edge stained, and sewed, when a plain edge is desired. In case the edge is to be finished by edge lacing, it will be necessary to trim the belt 1-8 in. narrower than the buckle width. Several types of buckles and end finishes are suggested by Sketches P, Q, R. The finished belt should be given a light application of leather dressing and the edge lacing a light coating of a burnishing wax or lacquer.

PREPARATION OF HORSEHAIR FOR HALF HITCH WORK

Horsehair is obtainable in several lengths—24 in. to 28 in.—and may be purchased by the pound. Twisted strands of horsehair, containing 8 to 10 hairs each, are used for half-hitch work. The hair in each strand should be twisted just enough to hold them loosely together. One procedure in preparing strands is to take two bundles of hair, four or five single lengths per bundle, and tie the ends of each bundle together as indicated by Sketch S, Fig. 15. The single strand with the knot in the middle is rolled or twisted together. It is then folded and placed over a support as indicated in Sketch T. Both strands are kept under tenson until a knot is tied in the end. The tension is then removed and the two strands twist loosely together as indicated in Sketch U.

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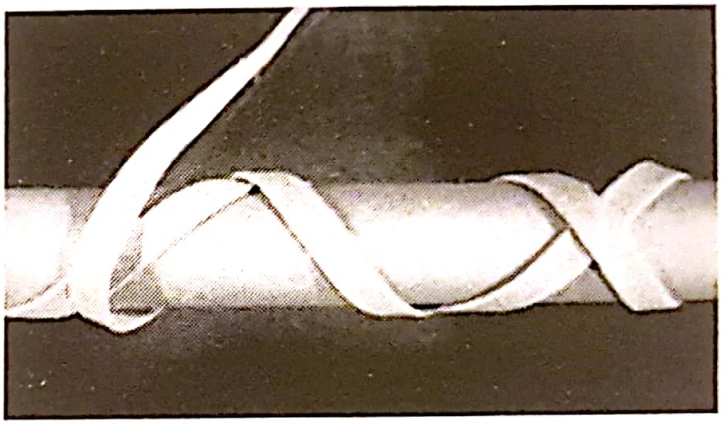
LONG TURK'S HEAD

SINGLE STRAND METHOD

A very useful and decorative knot which can be made any length. It is suitable for case handles and monkey straps, covering a splice on a strip or wooden handle, and if stitched down on completion, will decorate a browband, belt or other saddlery.
Tied on a horse or bull lead, this gives an excellent and attractive hand grip. The finished sequence is over 2 under 2, but under 3, 4, 5 etc. can be done in a similar manner.



1. *Wrap the strand in a symmetrical spiral to the right, then cross back to the left to the standing end.*

2. *After crossing over the standing end, the strand passes back to the right on the top side of the first pass.*

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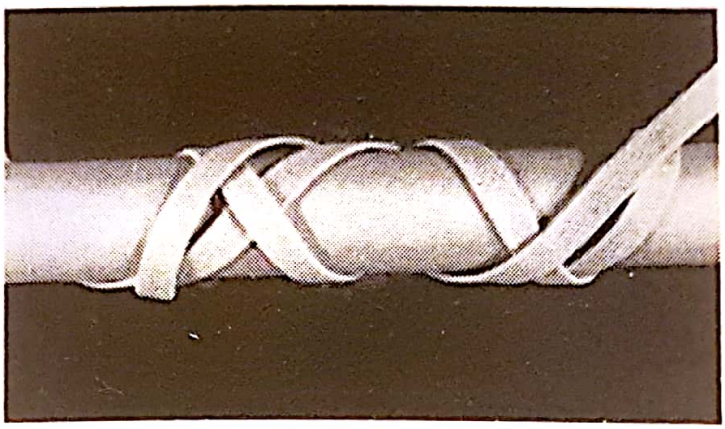
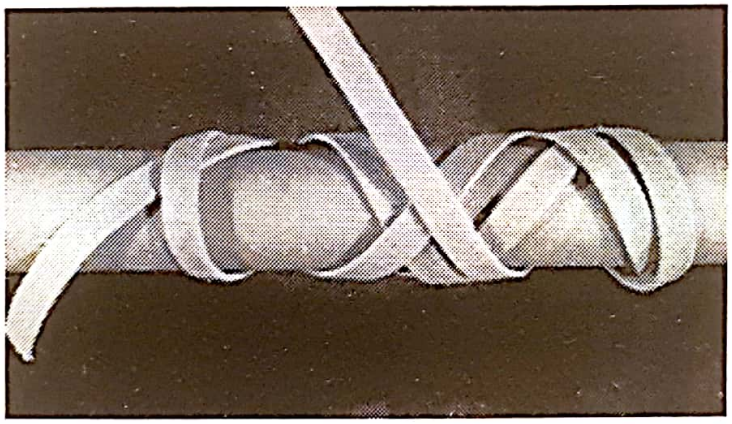
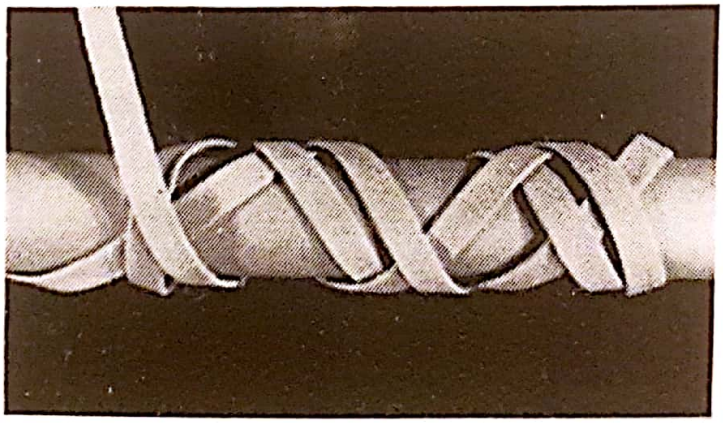


3. *The moving end passes over every cross strand, and at the end crosses over the end bight.*



4. *A loop is formed as shown, and the working end moves back to the left, crossing OVER each pair of strands.*



5. *At the extreme left of the knot, the strand crosses over the standing end and the other bight, and then moves to the right on the top side of the existing 2 strands.*

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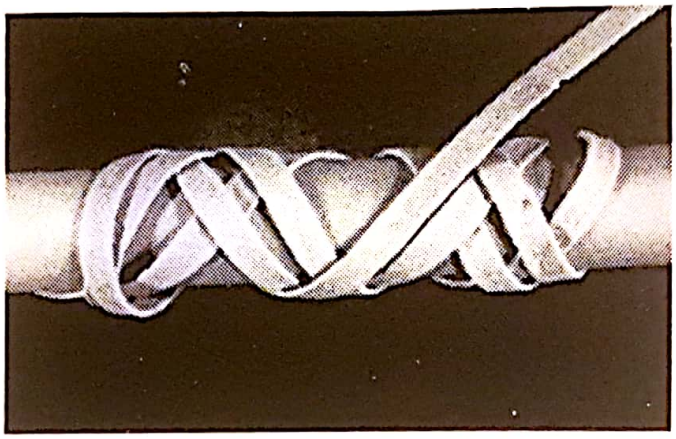
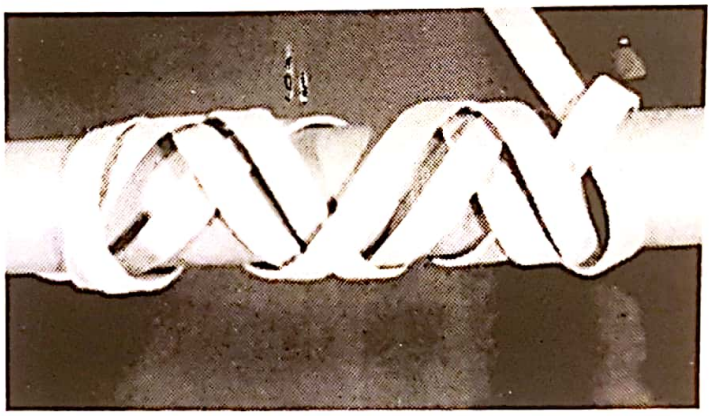
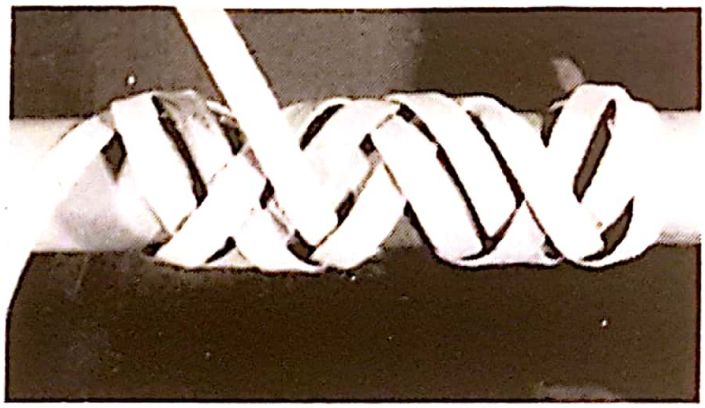


6. *A set of 3 parallel strands is formed as the working end is taken to the right, passing over every strand.*



7. *At the end, after passing over the two end bights, the working end comes back to the left, and this time the sequence is under 1, over 2.*



8. *The under 1, over 2 sequence is carried out all the way back to the left.*

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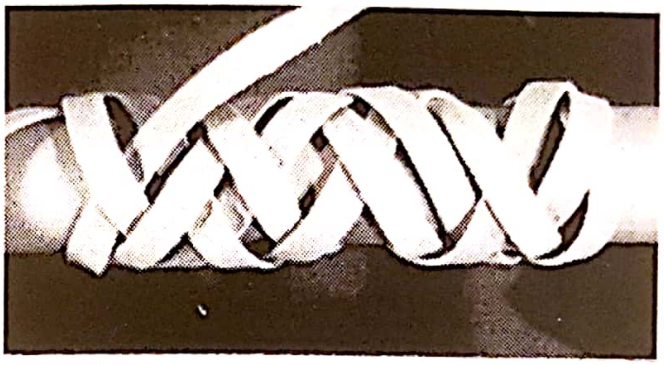
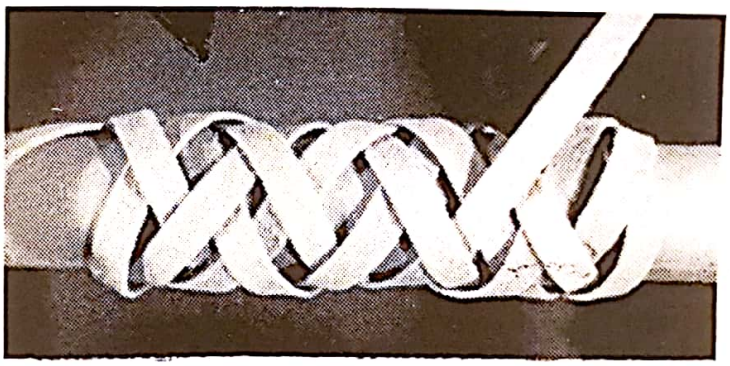


9. *Back to the right, under 1 over 2.*



10. *Under 1, over 2.*

11. *On the final move to the left the strand is taken under 2, over 2, under 2, over 2, etc.*

12. *The knot is complete when the working end meets the standing end.*

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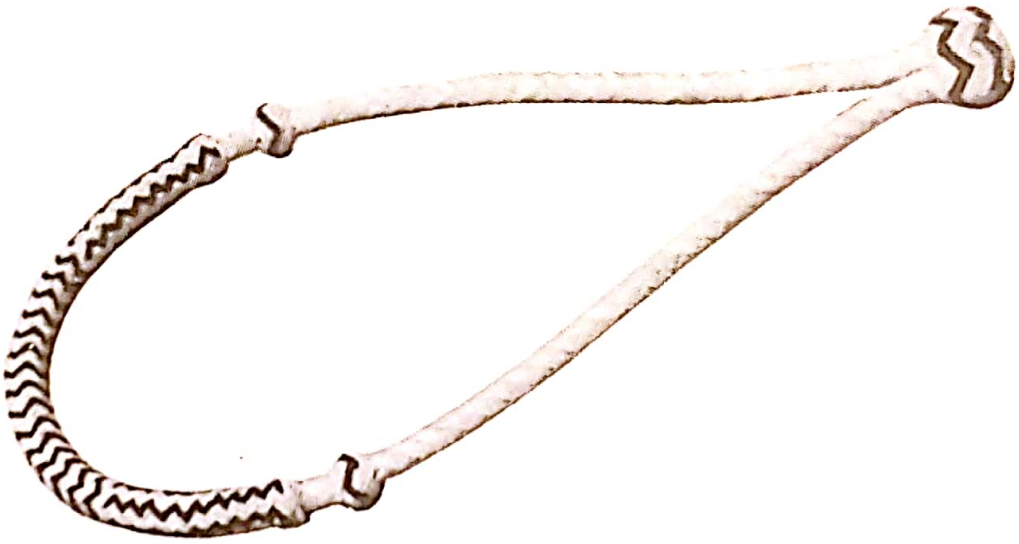
LONG TURKS HEAD

MULTIPLE STRAND METHOD



This is a versatile knot, designed for speed, convenience and attractiveness, and commonly used on the nose of bosals and in decorative knots on reins. It is very effective on monkey straps and case handles.

This under-2-over-2 sequence, as well as the single, triple, and over-4-under-4 etc., can be tied with any number of strands as well as with one long strand, but the disadvantages of the single strand are that, when yards of lacing have to be pulled through the knot many times during the braiding process, the leather towards the end tends to become stretched and narrow and often quite soiled. It is difficult to space the single strand correctly around the core, and also to achieve the correct tension in the early stages.

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1. A number of strands are spiralled around the core, leaving a space of one strand between each. It is not necessary to spiral the full length of the core initially, one or two turns will do.

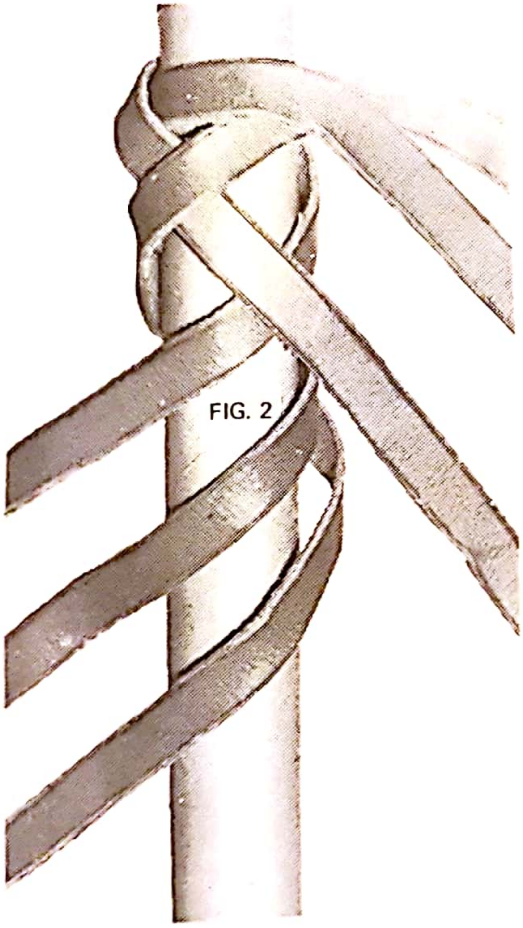

FIG. 2

FIG. 1

2. At the top, the ends are brought down as shown, each strand passed OVER the one next to it.

3. Pass each strand under one and over one in a regular plaiting sequence, leaving a space of one strand between each.

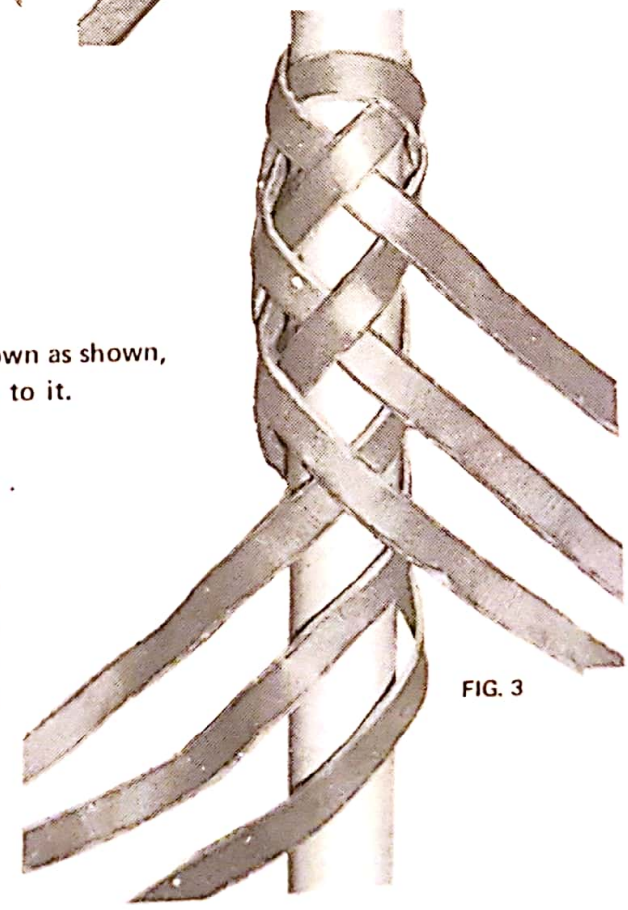

FIG. 3

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4. The sequence is continued until the required length of the knot has been plaited.

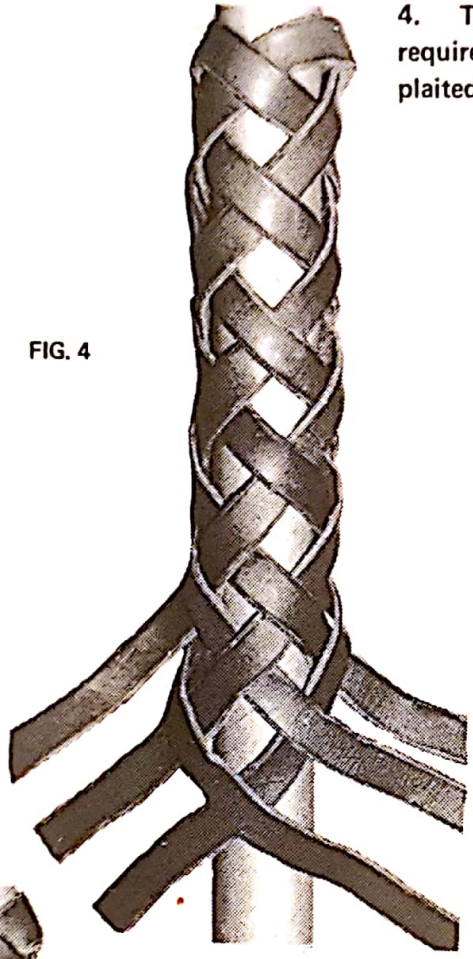

FIG. 4

6. At the top, after forming a series of parallel strands as illustrated, the strands are brought down to the right, passing over two, under two, splitting a pair of parallel strands on each move.

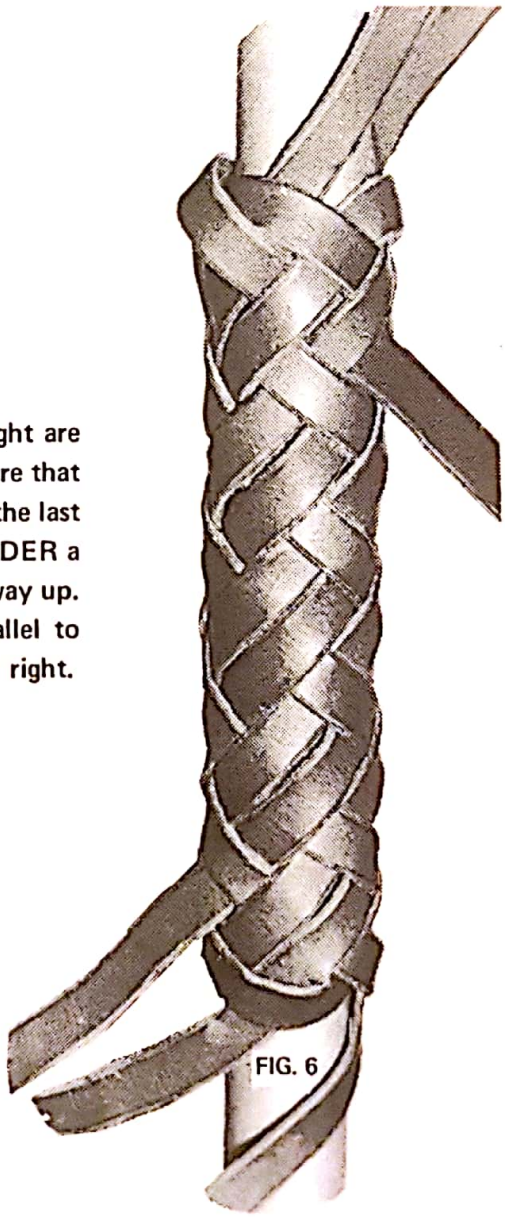

FIG. 6

5. The three strands to the right are plaited up to the right. Make sure that they all pass OVER a strand as the last move on the way down, and UNDER a strand as the first move on the way up. They should all be moving parallel to the strand immediately to their right.

FIG. 5

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7. Continue the sequence until the strands are plaited down near the centre, the ends staggered as illustrated.

FIG. 7

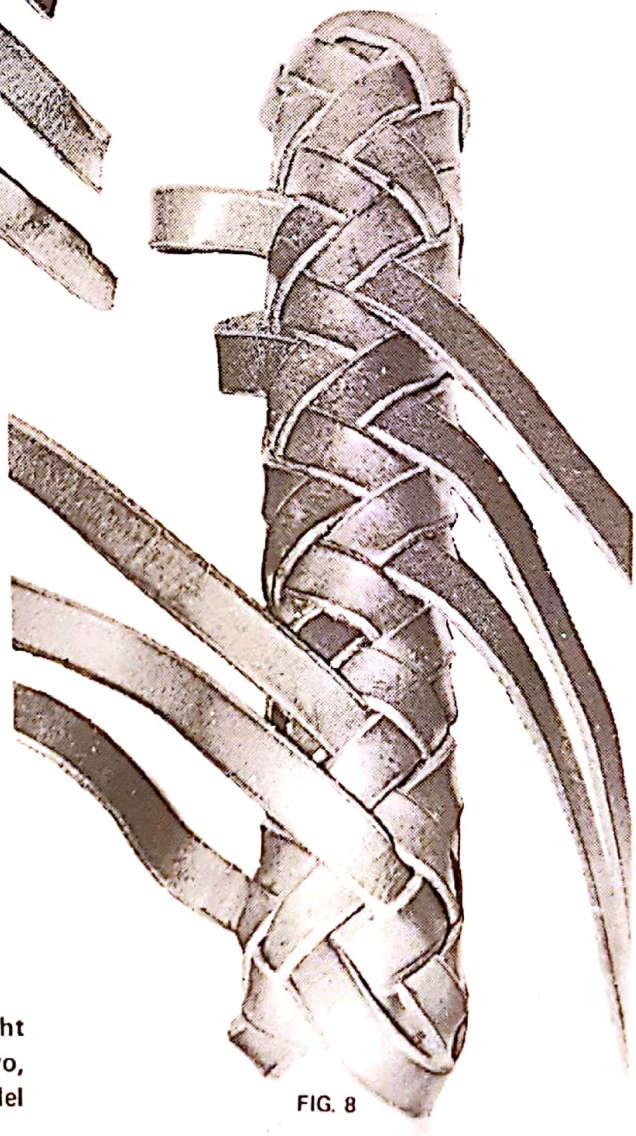

FIG. 8

8. The bottom strands are brought up to the left, passing OVER two, then under two etc., splitting parallel strands on each move.

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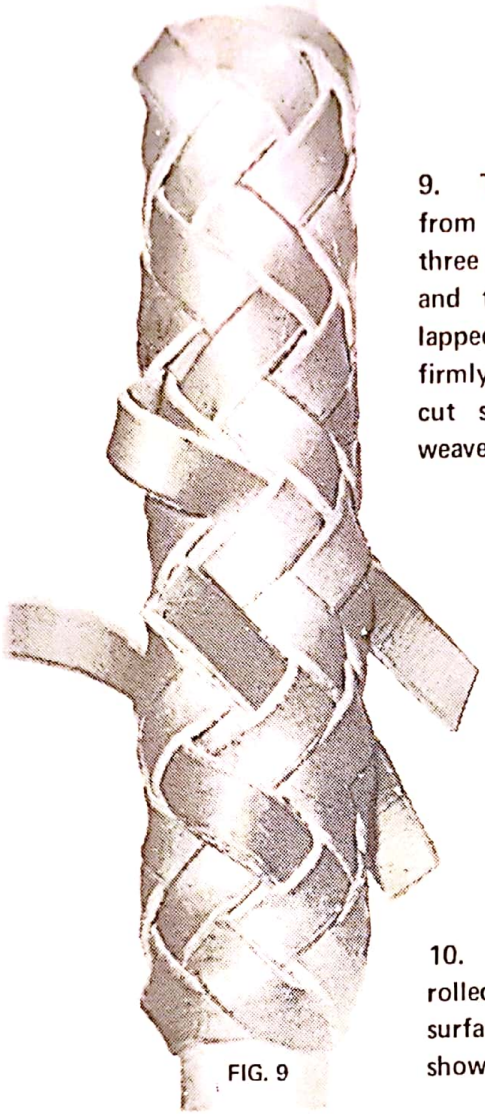

FIG. 9

9. The three strands from the top meet the three from the bottom and the ends are overlapped as shown, pulled firmly into position and cut short close to the weave.

10. Finally the knot is rolled on a smooth, clean surface and appears as shown.

FIG. 10

Illustrated on P. 187 are some fine examples in rawhide, of turkshead craftsmanship.

(A) Showing the use of turksheads to provide fastenings on the end of a rein, where it attaches to the bit.

(B) Another section of the reins. The largest knot is the same type as described on PPs 183 to 186. Finer strands (and more of them) are needed to give this effect, but the same principles can be used. The two-tone is particularly effective on this knot. On this pair of reins, 125 turksheads of various types have been tied, some to provide fastenings and others for ornamentation. The knots are always tied on the bit end of the rein, and give it weight so that it hangs down from the bit alongside the horse's neck. This serves a useful purpose in neck reining.

(C) This rawhide bridle shows the decorative effect that can be achieved with turksheads, which are also used in this case to hold the bridle together and allow for adjustment.

The bosal on P. 182 illustrates an adaptation of the multiple strand long turkshead. Here again dyed rawhide is interwoven to provide the two-tone.

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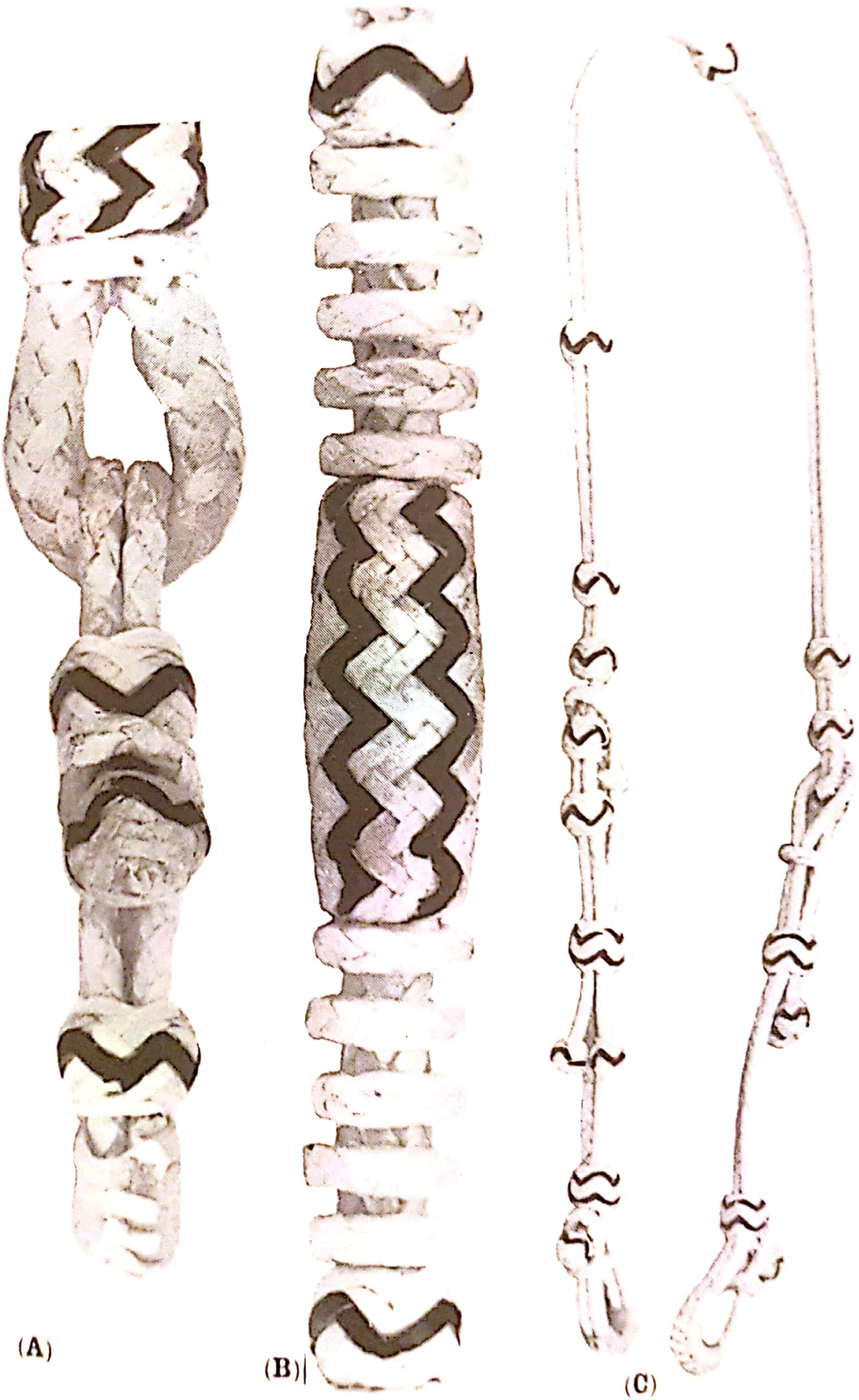

(A) (B) (C)

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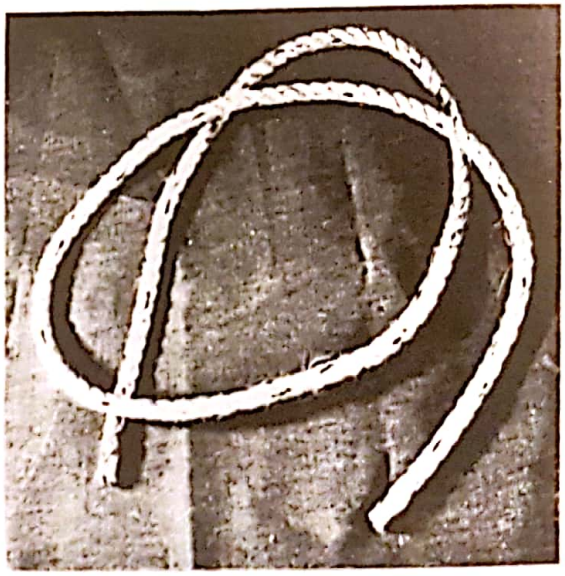
THE TURK'S HEAD KNOT

All horsemen and women come into contact with Turk's Heads on their crops and whips at some stage – usually when they come adrift and need replacing. Because many have some initial difficulty in tying these knots, we are printing a slightly different method of making two of the commonly used ones.
Probably the most important knot on whips is the knob on the end. This protects the foundation of the knob, as well as covering up all construction details, which usually are not very attractive.
The 4-Bight knot is often used because it closes completely together at the centre, whereas knots with more bights always leave a small hole. Rope has been used in the illustrations because it is easier to follow than other materials, and it is a good idea to practise these knots using rope or tight string before attempting the use of leather strands. Kangaroo strand 5/32-3/16″ width is usually the best for knobs, and a fid is a must, preferably a round, blunt seat awl blade 5″ to 6″ long. A heavy round needle can be used, but never use a sharp-edged or pointed instrument.

THE 4 BIGHT TURK'S HEAD



This knot is placed over a knob or around an article in the desired position, and tightened up symmetrically. A single knot is usually not enough to cover, so the strands are evenly spaced and the working end passed through the whole knot again, moving parallel to the original strands to double the knot. This Turk's Head is often found tripled or quadrupled on whip handles.

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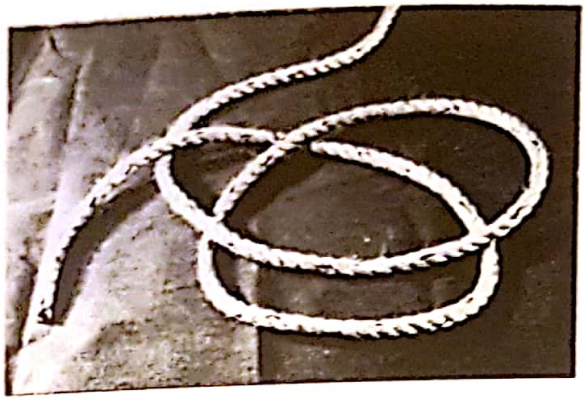
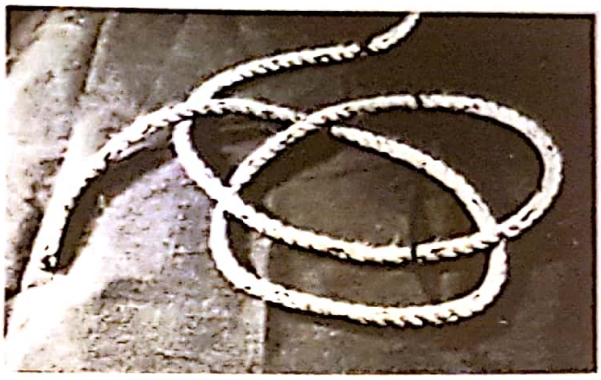
The starting or standing end is on the left, the working end on the right. Lay out a loop to the right, and another loop on the top as shown.



Pass the working end under the standing end.



The end is woven through the loops as shown by the arrow, over-under, over-under. This brings the ends together to form a finished Turk's Head of 3 parts and 4 bights.

THE 5 BIGHT TURK'S HEAD

This knot covers a relatively large diameter with a narrow plait which is exactly the same as the 3-plait used for girls' hair and horses' manes. It can be doubled or tripled to increase the coverage and is a convenient knot to cover the end of a plait on handles, particularly to cover up places where thread has been used to tie-off ends of plaiting.

Lay out the loops as illustrated.

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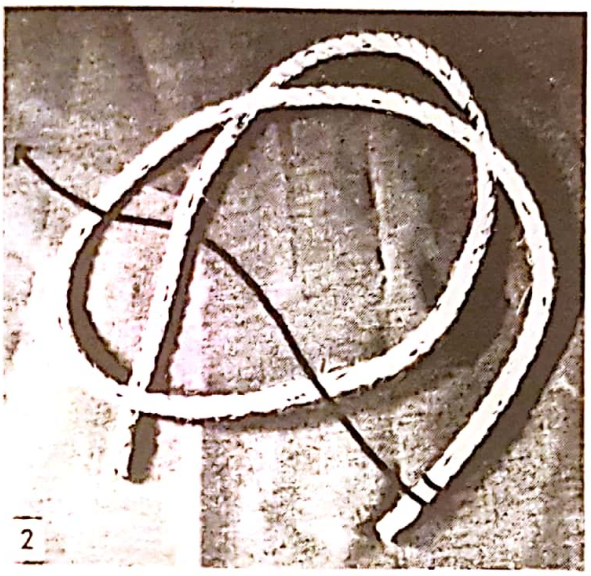
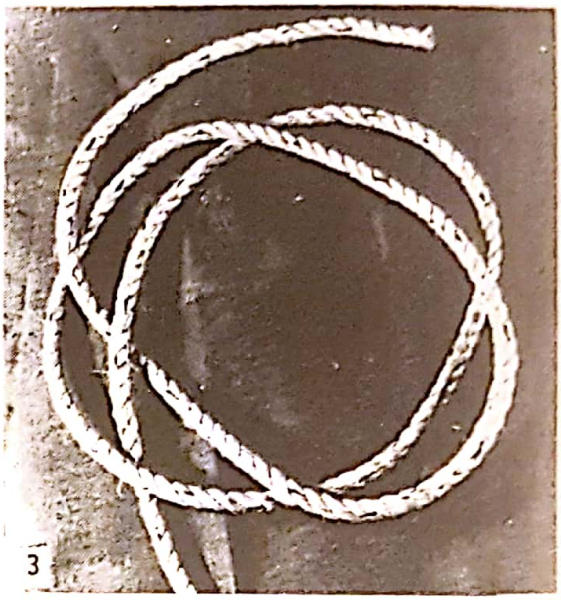
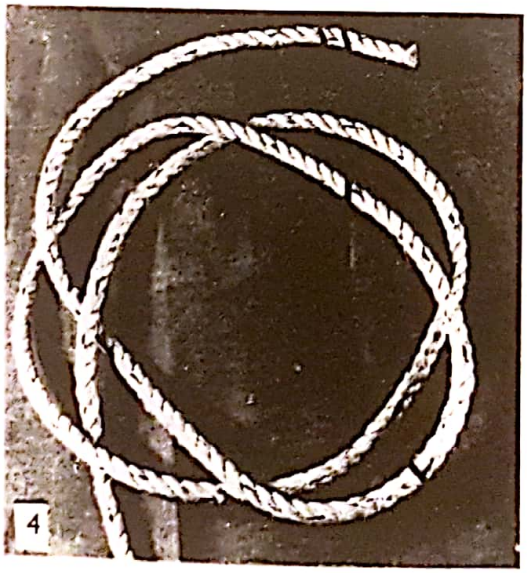


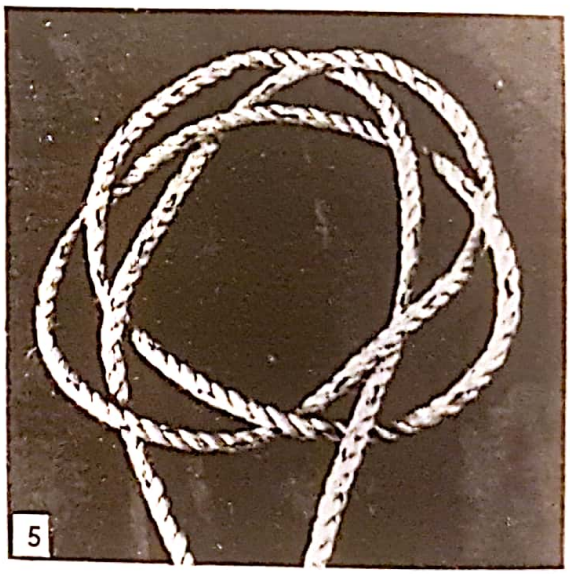
The working end is taken across the centre, over the outside loop, under the centre, and over the outside loop.



The construction should look like this.



The working end is woven through the loops as shown, passing under-over, under and over.



The two ends meet to form a 5-bight 3 part Turk's Head.

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WHIP HANDLE TURKS HEAD

This is neither the easiest nor necessarily the best knot for a whip handle knob, but it is certainly the most commonly used, and if properly done it will not easily come off.
Professional plaiters use it because it is quick to tie, is fairly versatile in that the same width strand can be used for slight variation of knob size, and because it has 4 bights it completely covers the knob, leaving no gap in the plait in the centre.

1. The arrow shows the direction of movement of strand. The standing end is at the base of the illustration and is held down onto the handle by the plaiter's thumb.

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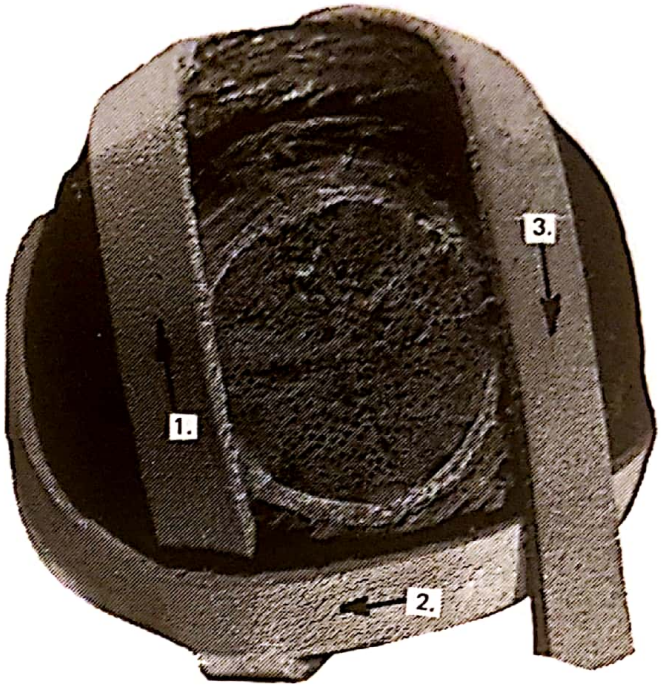
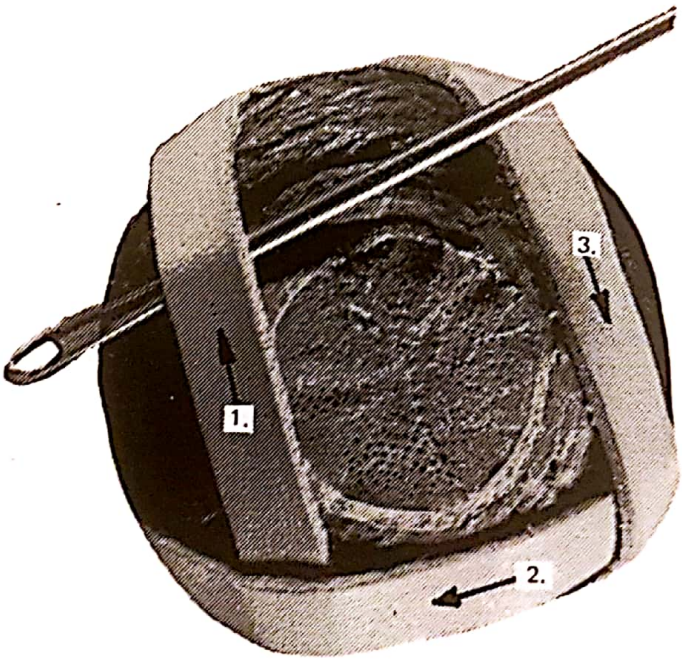


2. Each move of the strand is numbered in the order that it has been placed on the foundation of the knob. Every strand has crossed OVER the previous strand up to this stage.



3. The fourth move is shown by the needle passing under the first strand. This completes the square at the end of the knob, and all strands should be tight, and symmetrically positioned.

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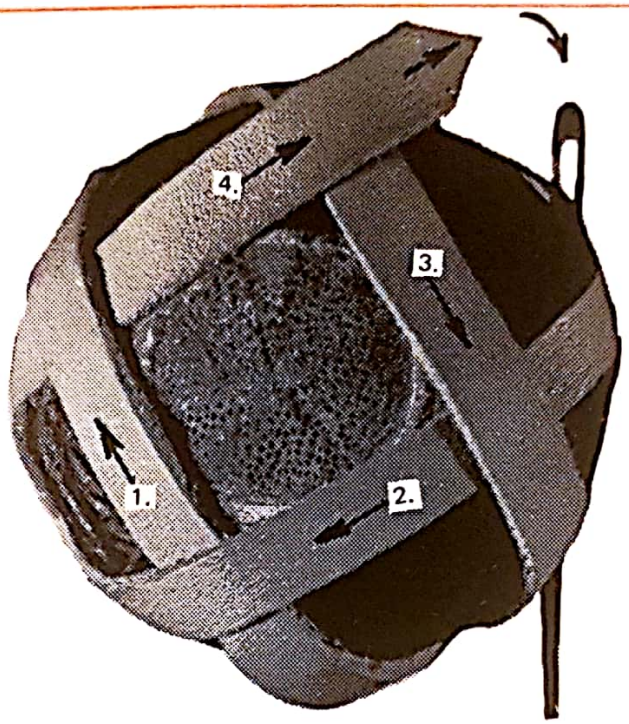
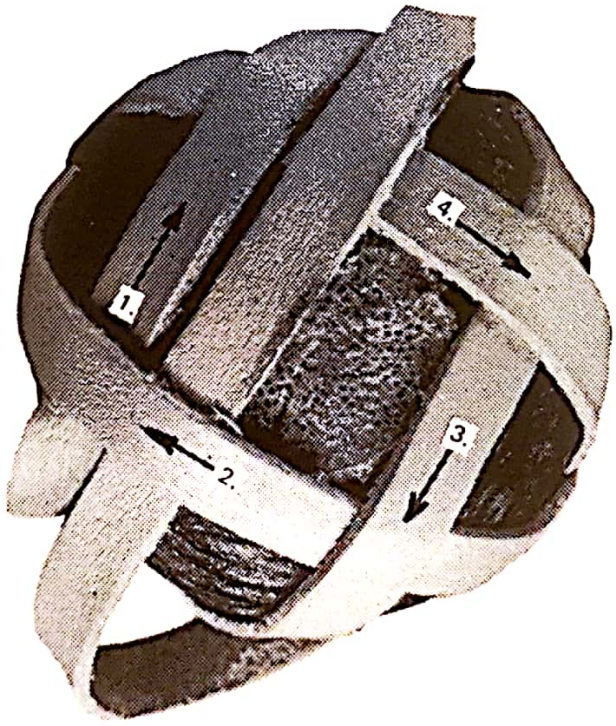


4. The needle shows the passage of the strand passing under No. 2 at the base of the knob, and this brings the starting end and the working end together for a complete knot.

Use a seat awl blade to make a path for the strand rather than work with a needle at this stage, because until other strands are brought into the weave the knot is very unstable.



5. The working end has been brought up alongside the first strand. The normal procedure is to parallel the base knot until there are 4 strands side by side all around the knot, although sometimes a tripled knot will cover. For best results the strand is halved, and the base knot is started from the mid point. At the stage of fig. 5 the working end is left where it is, and the knot is paralleled around the outside (or lower side) using what was formerly the standing end.

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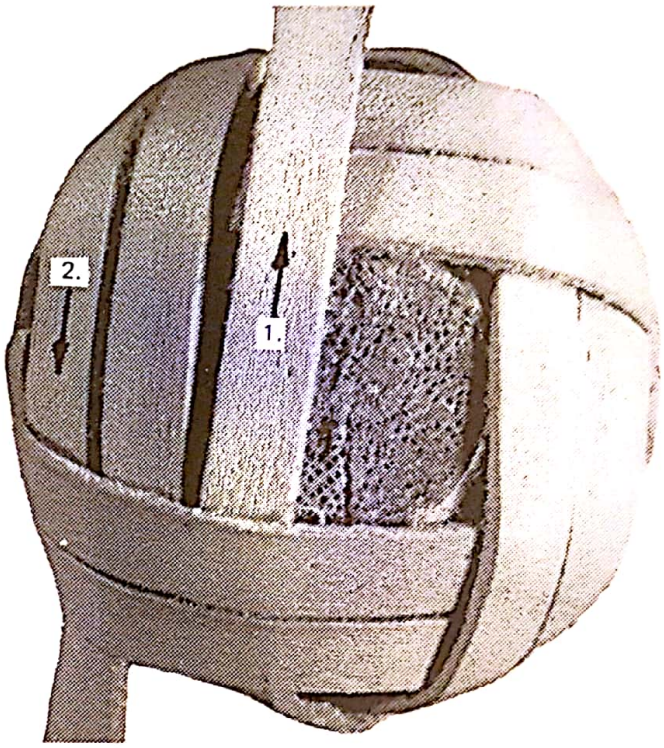

6. The first doubling has been completed by the strand marked 2, which is left in this position, and the original moving end marked 1 is now taken around in a similar way, but on the inside of the knot. The final move, not illustrated, is to take the outside strand around the knot, and then the two ends are pulled under the weave and cut off flush. The knot can be rubbed between the hands to burnish and smooth the plait.

THE HACKAMORE HEEL KNOT

This knot will be illustrated in three stages, the first being the formation of the foundation knot, the second is increasing this foundation, and the third is the interweave.

There are other methods of tying the foundation, but this one has the advantage of "staying put" better on the core.

It cannot be over-stressed that the principles involved are the important facts to study, not just the mechanics of one particular knot.

The reason for the interweave is to increase the covering capacity of the knot at the largest diameter, while leaving a lesser number of bights at the top and bottom, where less leather is needed. The interweave can give an attractive two-tone effect, which assists the beginner to follow the procedure and make fewer mistakes.

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1. The standing end is marked with a + and the working end with an arrow.

2. Pass the working end around the back and alongside to the right of the standing end, moving up parallel to this first strand, under one and over one at the top.

3. At the top the strand crosses over the standing end, and parallels it down on the left this time, under one, and over the bottom loop.

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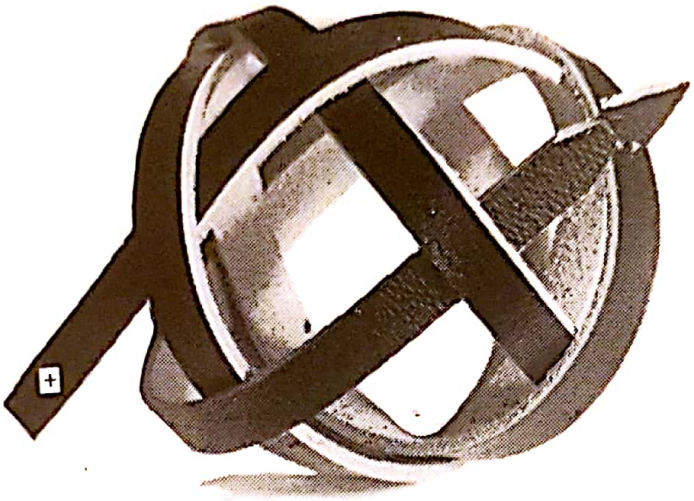
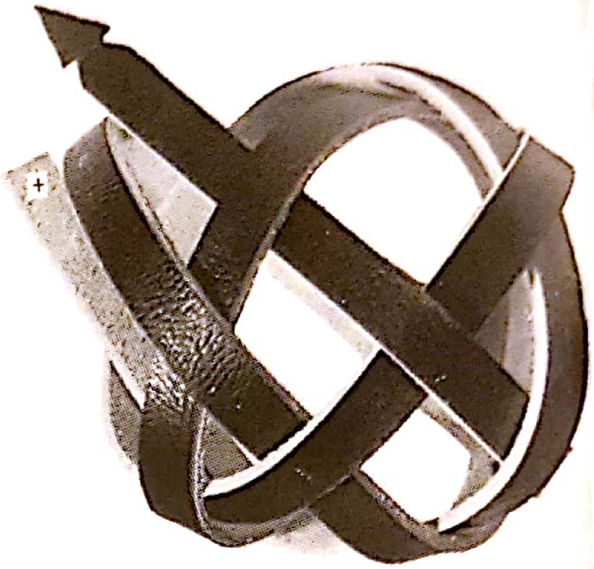


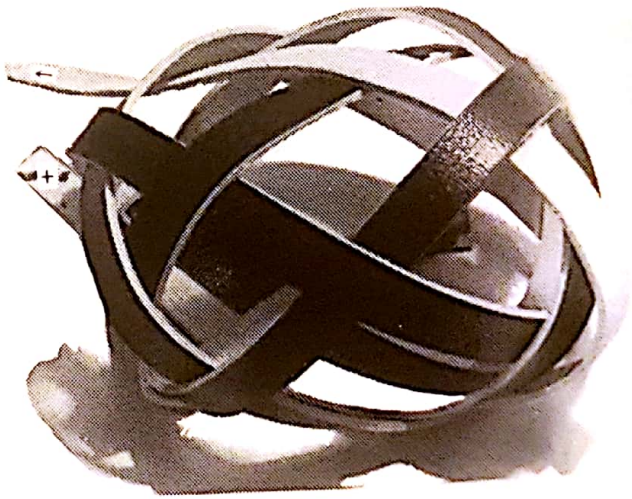
4. Now the working end passes between the standing end, and its last move, splitting this pair of parallel thongs, moving up to the right, over, under, over.



5. To the left, under, over, under, over. The working end has now met the standing end, forming a complete knot with 4 bights or loops each end.

6. The colour of the strand has been changed for the next four illustrations to show the sequences of increasing the size of the knot.

Parallel the standing end up, under, over, under and over the top loop.



7. Forming another loop or bight at the top, the strand crosses OVER the standing end and parallels down on the left, under, over, under, and over the bottom bight.

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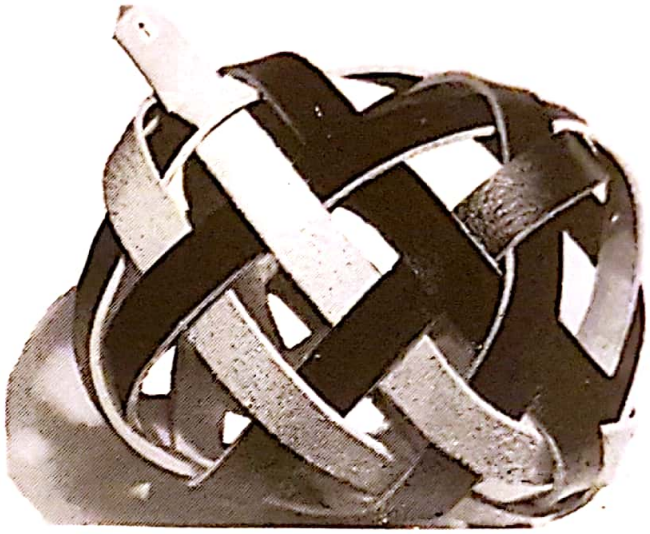
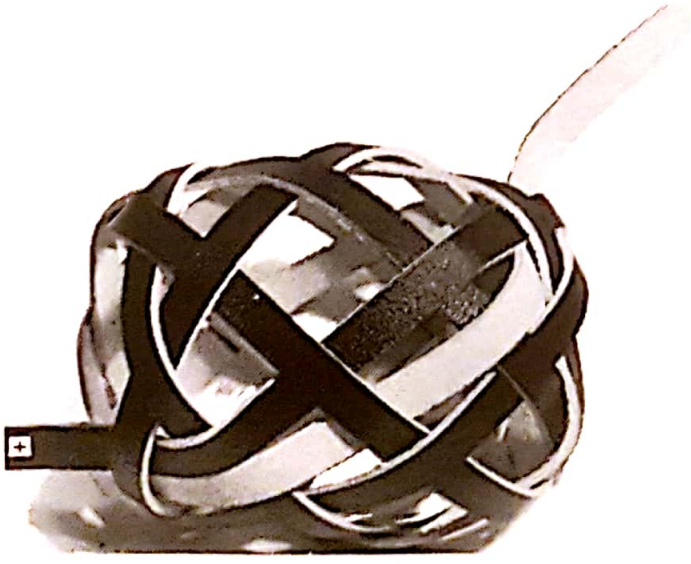
8. Forming a bight at the bottom by passing over the bottom loop; the working end splits a parallel pair of strands on the way up, under, over, under and over the top loop.

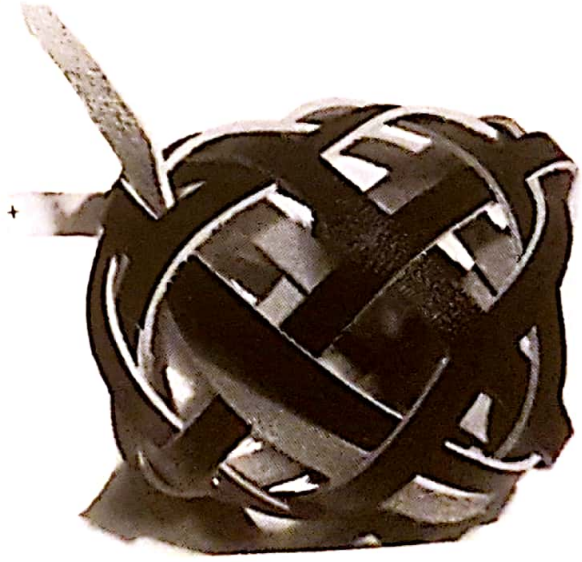


9. Another bight is formed, this time passing under the top loop on the way down, then splitting a pair all the way down, over, under, over, under and over the bottom loop.

We now have a 6 bight knot which can be increased to an 8 bight, 10, 12 etc., by paralleling up, crossing over at the top and paralleling down, then passing up and down, again splitting these parallel strands.



10. Now the interweave begins, and the previous knot is illustrated in one colour, the lighter colour being the interweave. Up to the right parallel to the standing end, under the bottom loop, then over, under, over, then under two strands where these intersect.



11. To the left, this time parallel to the strand on the right, over, under, over, and under 2.

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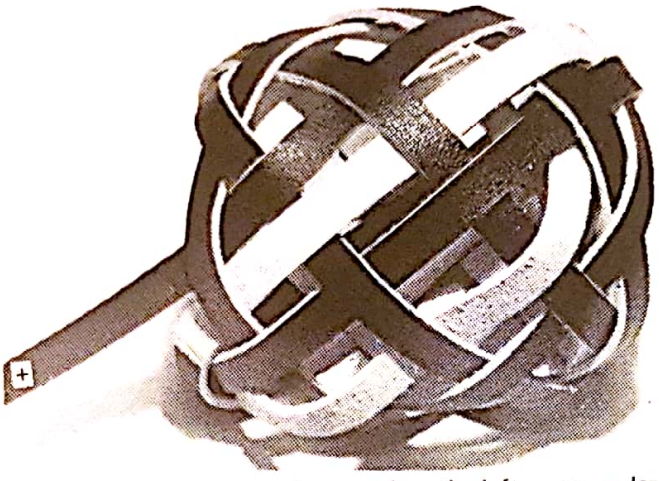
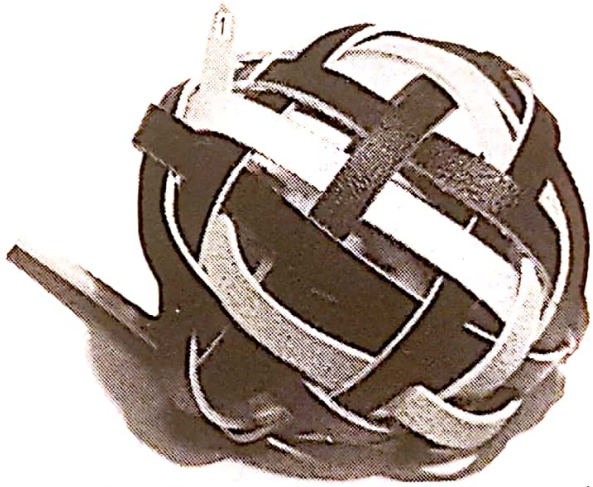


12. As before, parallel the strand on the left, over, under, over, then under 3 at the top splitting a pair of parallel strands, that is, passing between a white and a black strand.

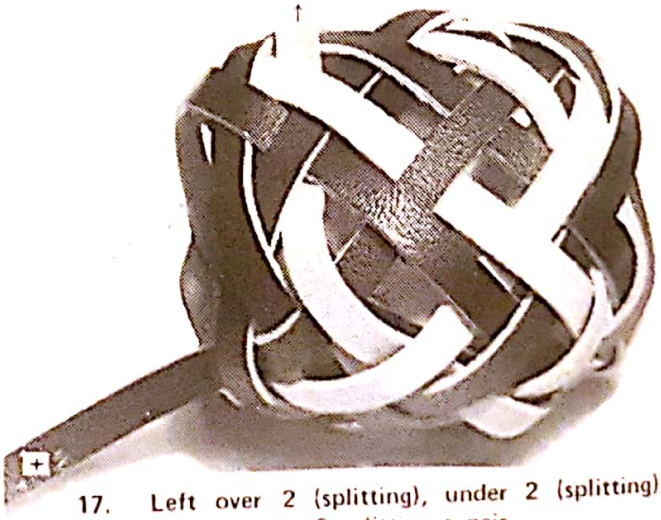
13. Left, over, under, over, then under 3 and the strand splits a black and white pair.

14. Right – over, under, over and under 3 splitting a pair.



15. Left over two splitting a pair, under, over, and under 3 splitting a pair.

16. Right over two splitting a pair, under one, over one, and under 3 splitting a pair.



17. Left over 2 (splitting), under 2 (splitting), over one and under 3 splitting a pair.

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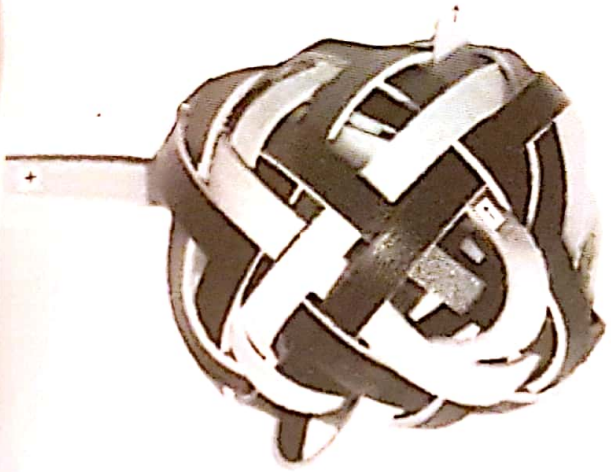
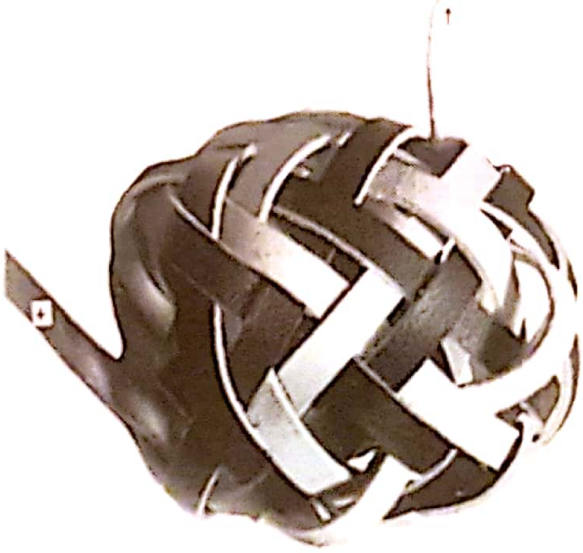
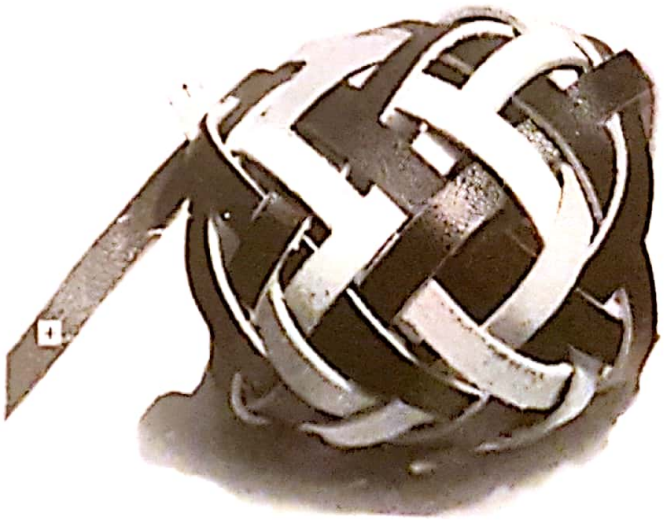


18. Right over 2 (splitting), under 2 (splitting), over one and under 3 (splitting).

19. Left over 2 (splitting), under 2 (splitting), over 2 (splitting) and under 3 (splitting).



20. Right over 2 splitting, under 2 splitting, over 2 splitting and under 3 splitting.



21. Left over 2 splitting, under 2 splitting, over 2 splitting. Pass the end under and cut off close to the weave, as the knot is now complete. (D.W.)

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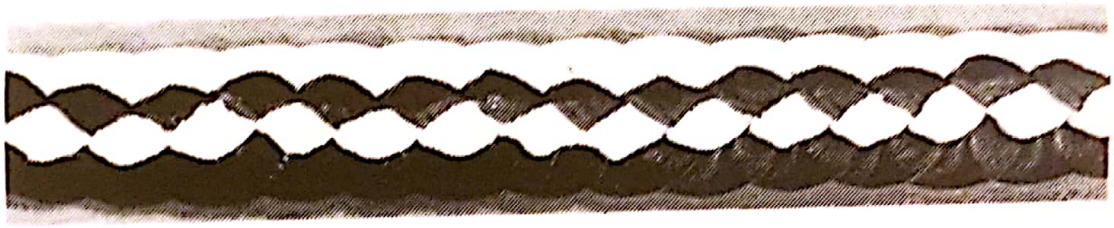
RIDGE PLAITING



This simple variation of ridge plaiting will be handy for anyone wanting to learn the principle used in the more complicated varieties. The ends are usually finished off with a series of hitches in this particular plait, and with two Turk's Heads used as fastening and adjustment, can make a fancy hat-band.

The plait can be started on a ring, and the other end plaited back on to another ring for belts or browbands, or when using wide strips of leather, the ends can be sewn into leather billets.

The six strand ridge is showy if three strands on the left are of one colour and the three on the right in a contrasting colour. Black and white looks particularly effective.

1. Arrange six strands side by side.

2. Cross the centre strands and twist them back so that the left strand goes back to the left, and the right one goes back to the right.

3. The next strand on the left passes under the two crossed strands and back to the left.

4. The next strand on the right, under two strands and back to the right.

5. Now the last strand on the left passes OVER one then UNDER two and back to the left.

6. Similarly, the remaining strand on the right passes OVER one and then UNDER two and back to the right.

Continue the sequence: extreme left strand over one, under two, back to the left; then extreme right over one, under two and back to the right, etc.

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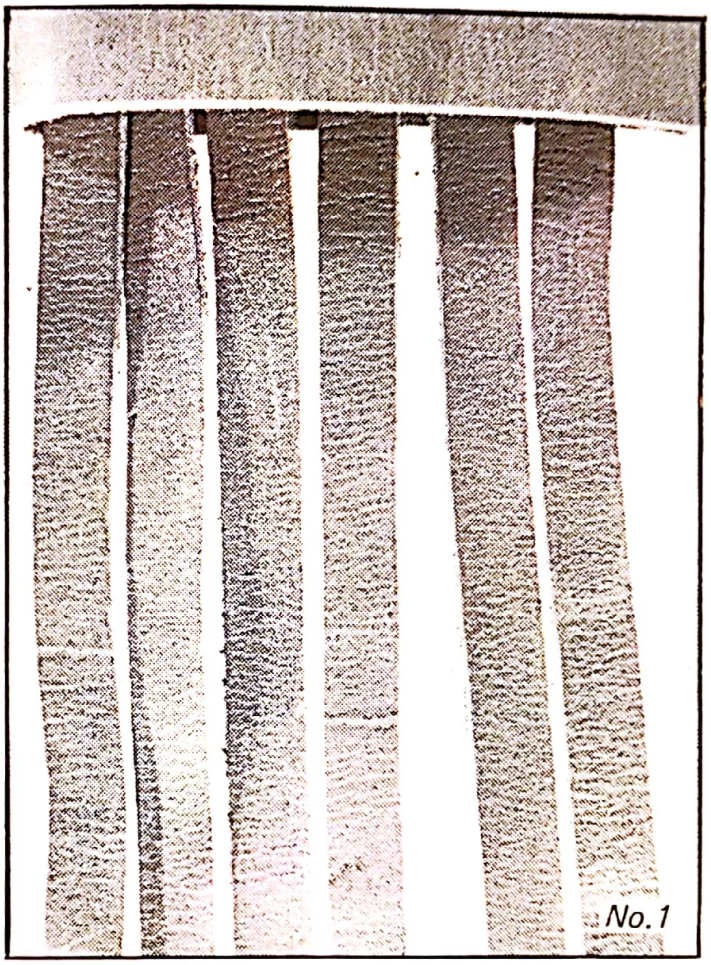

No. 1

No. 2

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No.3

No.4

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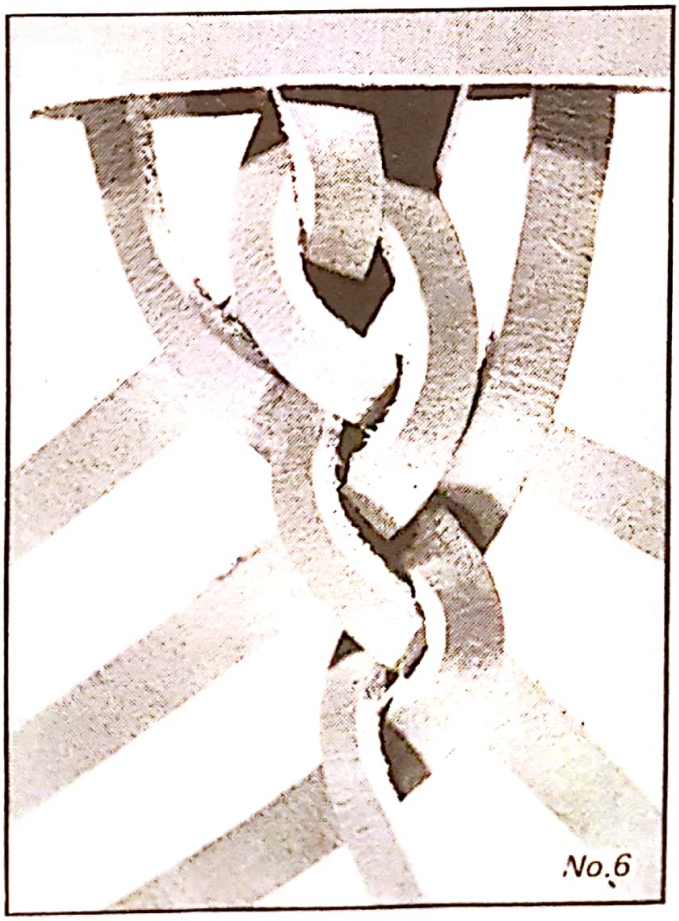

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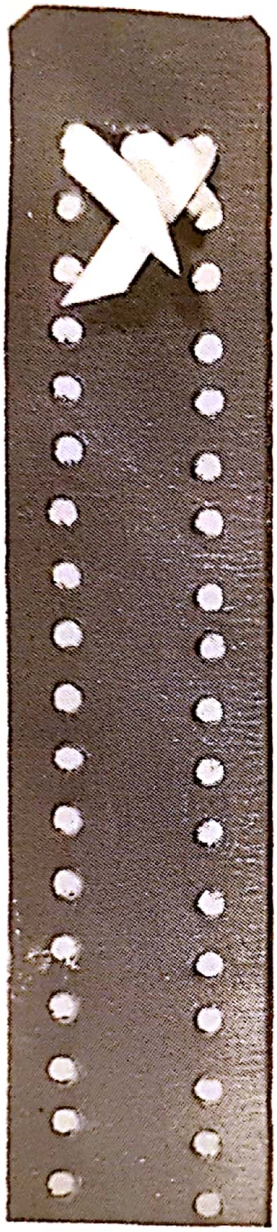
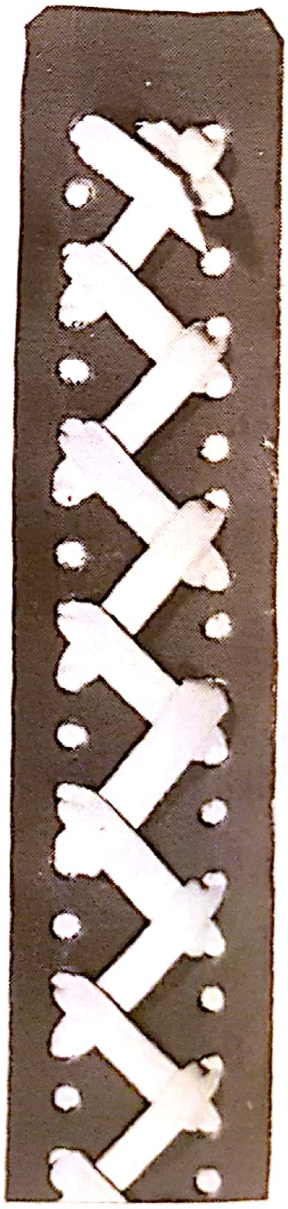


1. It may be easier to use 3 separate strands, but this gives you 6 ends to tuck in, whereas in this case we have disposed of 2 straight away. A double length strand has been passed through the centre hole from the back, into 2nd on right, back to first right then over itself. The other end is twisted slightly so it comes out of 1 left with the grain side facing.

THREE STRAND APPLIQUE



2. The first strand moves down to 4 left, back to 3 left, across itself, down to 5 right, up to 4 on the back and across itself. I usually count 3 free holes and put the working end in the 3rd. Keep the strand firm but not so tight that it wrinkles the leather.

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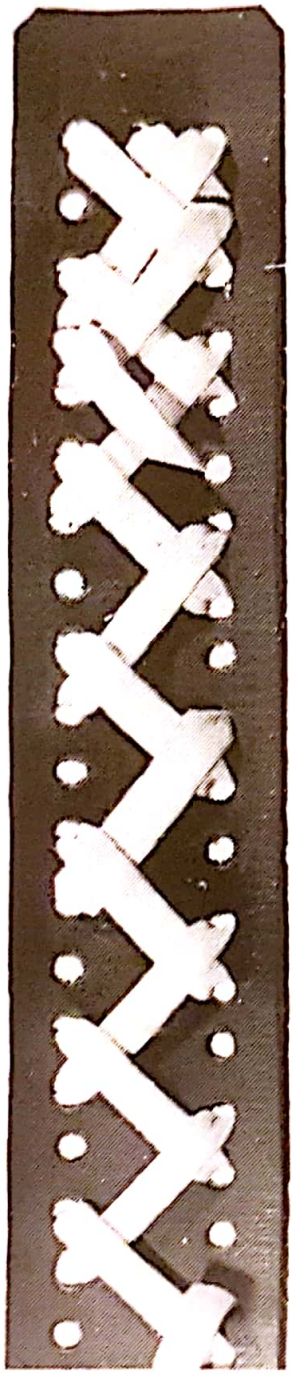
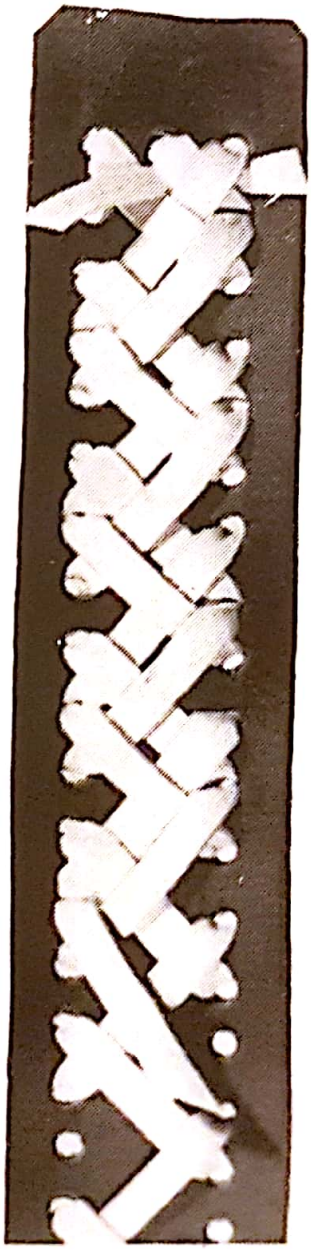


3. With the 2nd strand, follow down parallel to the first doing exactly the same only one hole lower down. This strand passes over itself on every occasion also over the first strand each time. Every alternate or 2nd hole will be occupied but if the strand is well pointed this causes no problems.



4. The 3rd strand has been introduced at the top - put it in the middle hole if it looks well there, only then you'll have the problem of disposing of the end neatly at the back.

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5. The last strand weaves down in between the first two, making an over one under one pattern and this is fairly self evident once you have reached this point.

5-PART INSIDE PLAIT

This is very suitable for belts and bridle browbands. Both ends are solid leather, so there are no loose ends to tuck in, and it is simple to attach buckles or stitch the ends back for a browband. The plaiting will reduce the length AND width by about one quarter, so allowances must be made in both directions.

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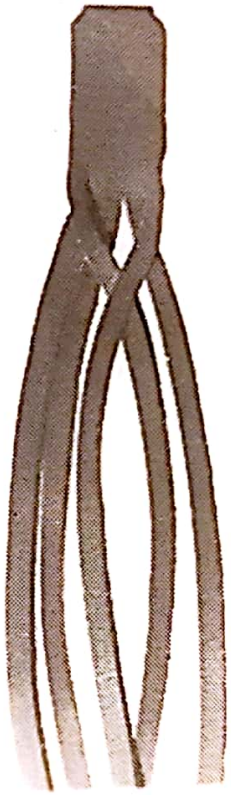
1



2

3

1. The width at the ends is 1" and in this case each strand has been cut $\frac{1}{4}$" wide, which seems to come out about right using heavy leather. The cuts are carried on into the narrow part of the strap for 1/8" so the strands reduce in width for about 3/4" each end.

2. Bring the left hand strand to the centre then the right hand strand over to the centre. Up to this stage we have made two moves. Pay no attention to the corresponding plait that develops at the other end, this will be eliminated shortly.

3. Continue until you have made 5 moves, and the last strand should have been from the left. The arrow indicates where the end is now passed through the plait, which is simply following the bottom left strand through the weave to the other side.

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4. At this stage the plait looks like this; the sequence continues, starting from the right, which is counted as move one. Then 2nd from the left, 3rd right, 4th left and 5th from the right.

5. The plait should look similar to fig. 5, and the arrow indicates where the end is passed through the weave, which is like following the centre strand through the weave, to the other side.

6. After passing the end through, the plait should be free from tangles with the last strand coming from the right. Towards the end of the work when the leather is getting very tight, do the first set of 5 moves, put the end through, then do another 3 moves and put the end through. The strap can still be straightened out if care is taken in positioning the strands.

4

5

6

Continue the sequence, which is 5 moves starting from the left, then follow the bottom left strand through the weave. Then 5 moves starting from the right, then follow the centre strand through. When you can no longer finish a full set of moves, even up the plait – although if you couldn't quite make the next series, try tightening up the plait from the start, put in the next lot of plaiting, then even up the work. The easiest way is to replait from the bottom, with the rough side facing you.

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